THE ARCHITECTURAL RECORD

APRIL
1932

Here is more proof that *beauty* in architecture has *commercial value*

• • • • before

• • • • after

WHEN the Webb C. Ball Company, Silversmiths and Jewelers, improved the appearance of their premises on Euclid Avenue, they received a threefold return on their investment, the satisfaction of having a beautiful marble building, and a fine retail establishment for conducting their own business, and higher rent returns from the upper floors.

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NEW YORK ATLANTA CHICAGO DALLAS CLEVELAND

After — The Webb C. Ball Company Building, Cleveland, Ohio, remodelled 1931. Walker & Weeks, *Architects*, The S. W. Emerson Company, *General Contractors*. All marble above second story window sills — Pink Georgia Marble, fine axed finish.

GEORGIA MARBLE

THE ARCHITECTURAL RECORD

VOL. 71 NO. 4 APRIL, 1932

F.W. DODGE CORPORATION

Published monthly by

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Cover: HOUSE OF MR. FRANCIS COLLINS, FIELDSTON, RIVERDALE-ON-HUDSON, NEW YORK CITY
Dwight James Baum, Architect
Photograph by Samuel H. Gottscho

Frontispiece: ENTRANCE TO FORUM OF EDUCATION BUILDING, CAPITOL PARK, HARRISBURG, PENNSYLVANIA
Gehron and Ross, Architects

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Owner	Location	Architect
Francis Collins	Fieldston, N. Y.	Dwight James Baum
W. E. Risser	Santa Barbara, Calif.	Winsor Soule and John F. Murphy
Thomas McCall	Fieldston, N. Y.	Dwight James Baum
Stella Smith	Palos Verdes Estates, Calif.	Winchton L. Risley
Guest House, Estate of E. Hope Norton	Darien, Conn.	Charles S. Keefe
Gilbert Bloss	Palos Verdes Estates, Calif.	H. Roy Kelley
E. H. Corlett	Lake Katonah, N. Y.	Waldron Faulkner
440 Via Media	Palos Verdes Estates, Calif.	Winchton L. Risley
Herbert Hicks	San Marino, Calif.	Arthur R. Hutchason

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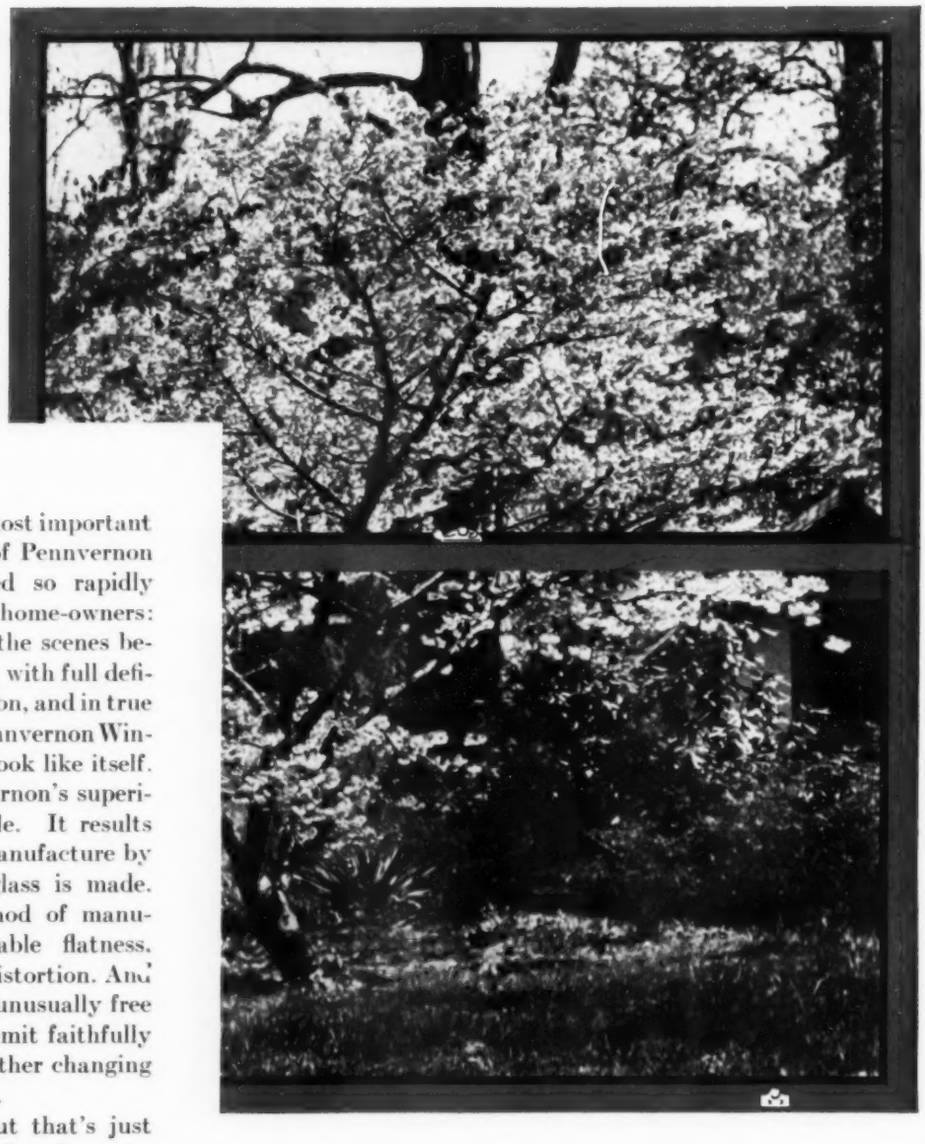
Nature looks natural
through Pennvernon windows



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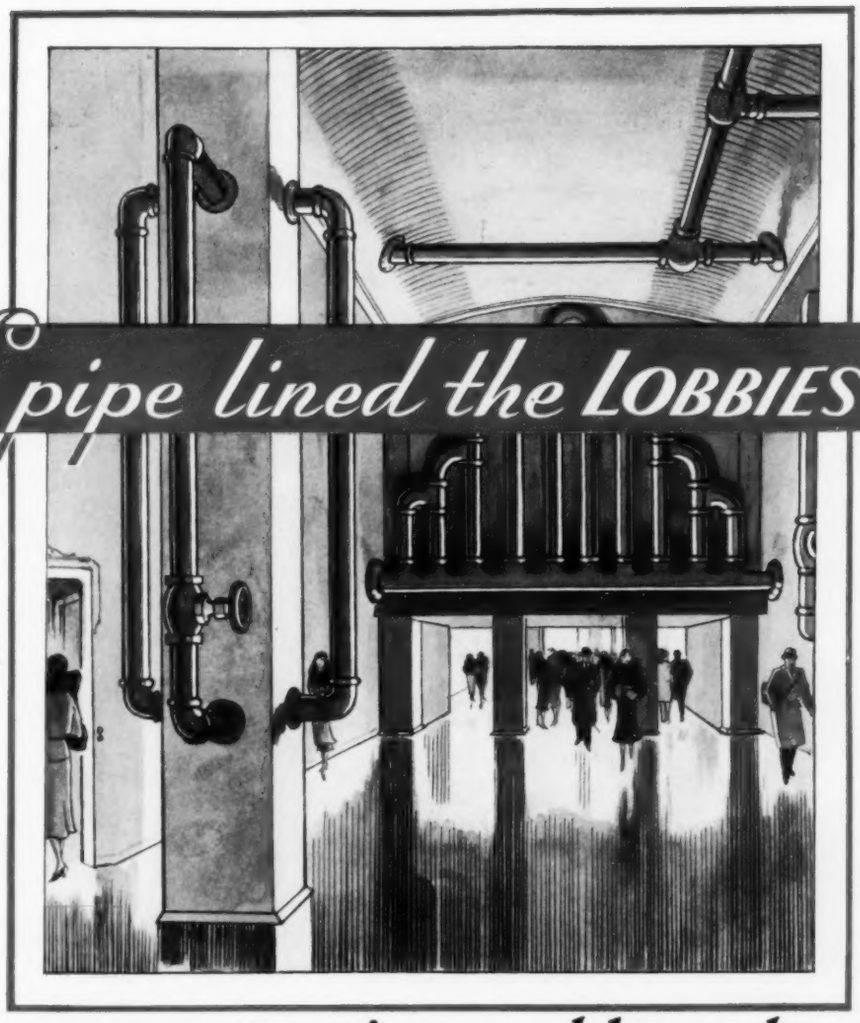
PENNVERNON
flat drawn
WINDOW GLASS

If pipe lined the LOBBIES



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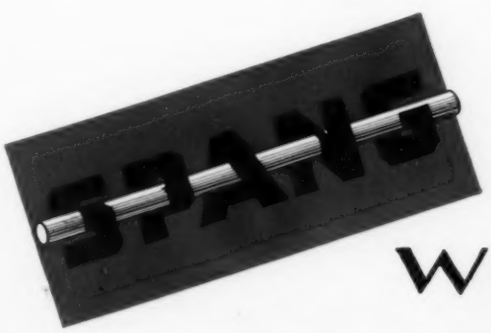

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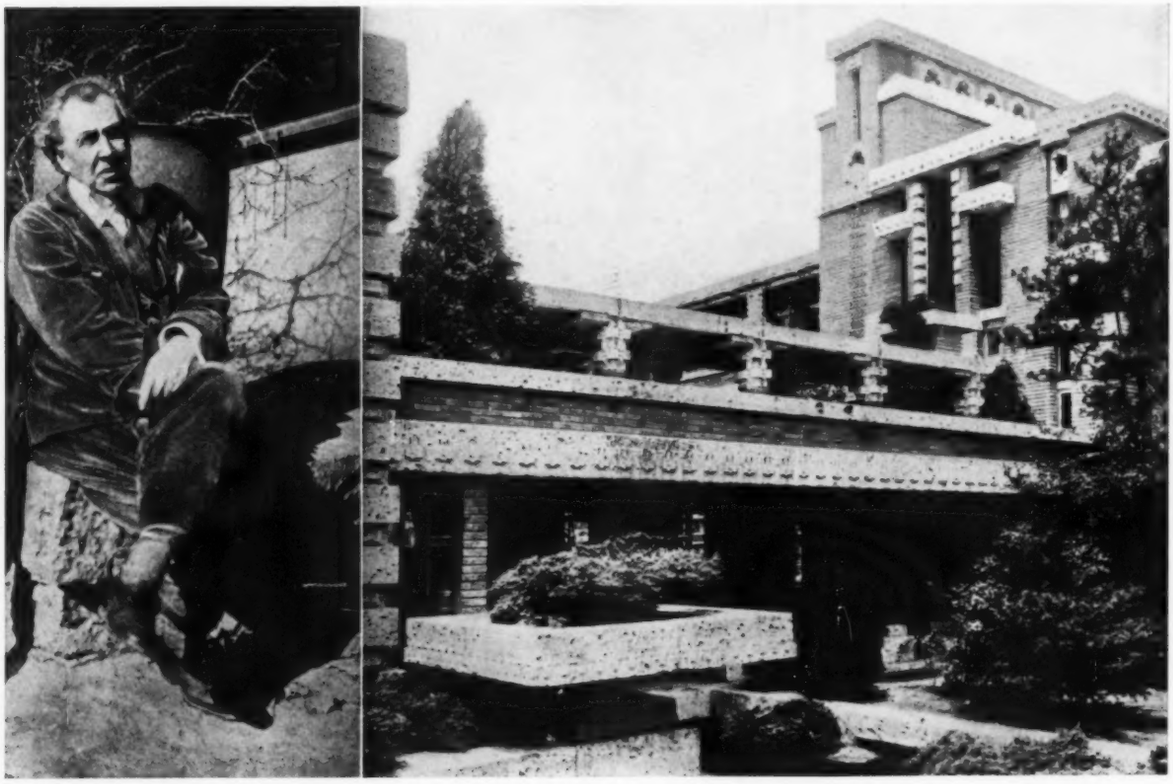

Two Photographs from the Autobiography of Frank Lloyd Wright

MR. WRIGHT — THE IMPERIAL HOTEL IN TOKIO

AN AUTOBIOGRAPHY: FRANK LLOYD WRIGHT. Longmans, Green and Co., 25 Fifth Avenue, New York City. Price $6.

This book, a landmark in the history of American architecture, has just come off the press. It will be reviewed critically by Fiske Kimball in the next issue of THE ARCHITECTURAL RECORD.

●

NEWS OF NEW BOOKS

"Planning for Residential Districts," Volume 1 of the final report of the President's Conference on Home Building and Home Ownership, is now ready for distribution. It contains a foreword by President Hoover and an introduction by the editors, John M. Gries and James Ford. Ten other volumes are in preparation. Each is priced at $1 plus 15c postage, or the set of 11 volumes at $10 plus 50c postage. Address: John M. Gries, President's Conference on Home Building, New Commerce Bldg., Washington.

An estimate of Architecture as a career, by Harvey Wiley Corbett, architect, will be issued again when Doubleday Doran republishes "An Outline of Careers," a practical guide to achievement, edited by Edward L. Bernays.

TWO LECTURES ON ARCHITECTURE BY FRANK LLOYD WRIGHT. The Art Institute of Chicago. 63 pages, illustrated. $0.75.

The first lecture is labeled "In the Realm of Ideas;" the second, "To the Young Man in Architecture." Both voice again the Taliesin idealism—the vision of the machine as the line of freedom for man, a new integrity (which has always been Mr. Wright's) working for this freedom and for an architecture preserving human values.

MEN AND BUILDINGS. By John Gloag. Published by Country Life Ltd., and Charles Scribner's Sons. 246 pages. Price 8s. 6d.

This book may be classed as a descriptive narrative of the art of architecture rather than a technical book or textbook on architectural development. Mr. Gloag traces the development of the "English Tradition" through the Roman, Saxon, Gothic and Renaissance periods. He discusses present-day problems and achievements, including the various forms of "modernism" and trends that may possibly be developed in the future. He gives a supplementary list of books by other authors who deal with the subject in a more formal or technical manner. Numerous references are made to standard works, and an index completes the volume.

Recognized Architects planned nearly $5,000,000 of Sears home construction in 1931

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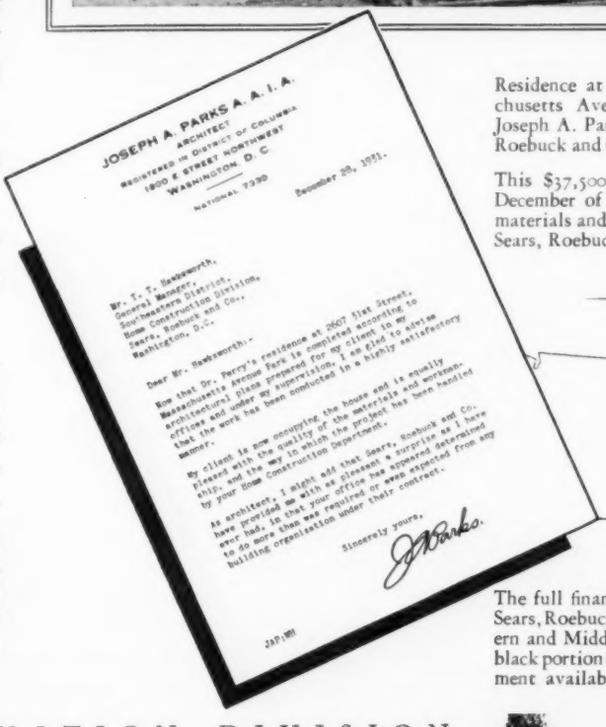
Residence at 2607 Thirty-first Street, Massachusetts Avenue Park, Washington, D. C. Joseph A. Parks, A. A. I. A., Architect. Sears, Roebuck and Co., Contractors.

This $37,500 project was completed during December of 1931 at Washington, D. C. All materials and construction service provided by Sears, Roebuck and Co.



JOSEPH A. PARKS A. A. I. A.
ARCHITECT
REGISTERED IN DISTRICT OF COLUMBIA
1800 E STREET NORTHWEST
WASHINGTON, D. C.
NATIONAL 7330

December 28, 1931.

Mr. T. T. Newsworth,
General Manager,
Southeastern District,
Home Construction Division,
Sears, Roebuck and Co.,
Washington, D.C.

Dear Mr. Newsworth:-

Now that Dr. Perry's residence at 2607 31st Street, Massachusetts Avenue Park is completed according to architectural plans prepared for my client in my office and under my supervision, I am glad to advise that the work has been conducted in a highly satisfactory manner.

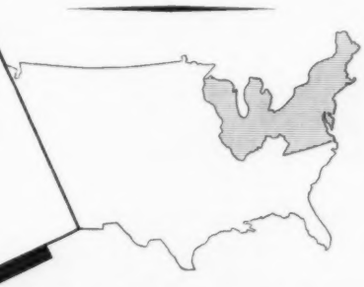
My client is now occupying the house and is equally pleased with the quality of the materials and workmanship, and the way in which the project has been handled by your Home Construction Department.

As architect, I might add that Sears, Roebuck and Co. have provided me with as pleasant a surprise as I have ever had. In that your office has appeared determined to do more than was required or even expected from any building organization under their contract.

Sincerely yours,

J. A. Parks

JAP:MH



The full financing and construction service of Sears, Roebuck and Co. is available only in Eastern and Middle Western States as indicated on black portion of map above. Materials and equipment available throughout the United States.

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In 1931 Sears reproduced Mt. Vernon for the U. S. Government, at the French Exposition Colonniale Internationale. Sears is now reproducing this Historic American Shrine in Prospect Park, Brooklyn, and also a replica of Federal Hall in Bryant Park, New York City, for the Washington Bicentennial Commission.

SCHOOL BUILDINGS OF TODAY AND TOMORROW. By W. K. Harrison, architect, and C. E. Dobbin, deputy superintendent of school buildings, New York City. Compiled and edited by R. W. Sexton. Architectural Book Publishing Company, Inc., New York City. 233 pages, illustrated. $16.50.

The book is illustrated profusely. The many photographs, plans, sections, working details and descriptive matter should be of large practical use. Much stress is laid on standardization of school buildings—elementary, junior high and high—as well as of their construction. The standard details, developed by the Architects of the New York Board of Education, are comprehensive and serve the purpose of reducing drafting and construction costs.

CALIFORNIA GARDENS. By Winifred Starr Dobyns. Published by The Macmillan Company, New York. 223 pages, 207 photographic plates. $5.00.

This volume contains more than 200 full-page illustrations showing California gardens of all types. A foreword by Myron Hunt emphasizes the importance of landscape architecture at the outset of planning a home and during each succeeding stage in the life of the garden, and expresses appreciation of the work done by women along this line.

Excellence in photography, good reproductions in offset printing, and a wide variety of subject material make the book desirable.

Photograph from "California Gardens"

ESTATE OF I. EISNER, LOS ANGELES
GORDON B. KAUFMANN, ARCHITECT
PAUL G. THIENE, LANDSCAPE ARCHITECT

Photograph from "The Brown Decades"

SCHLESINGER AND MAYER BUILDING, CHICAGO
LOUIS HENRY SULLIVAN, ARCHITECT

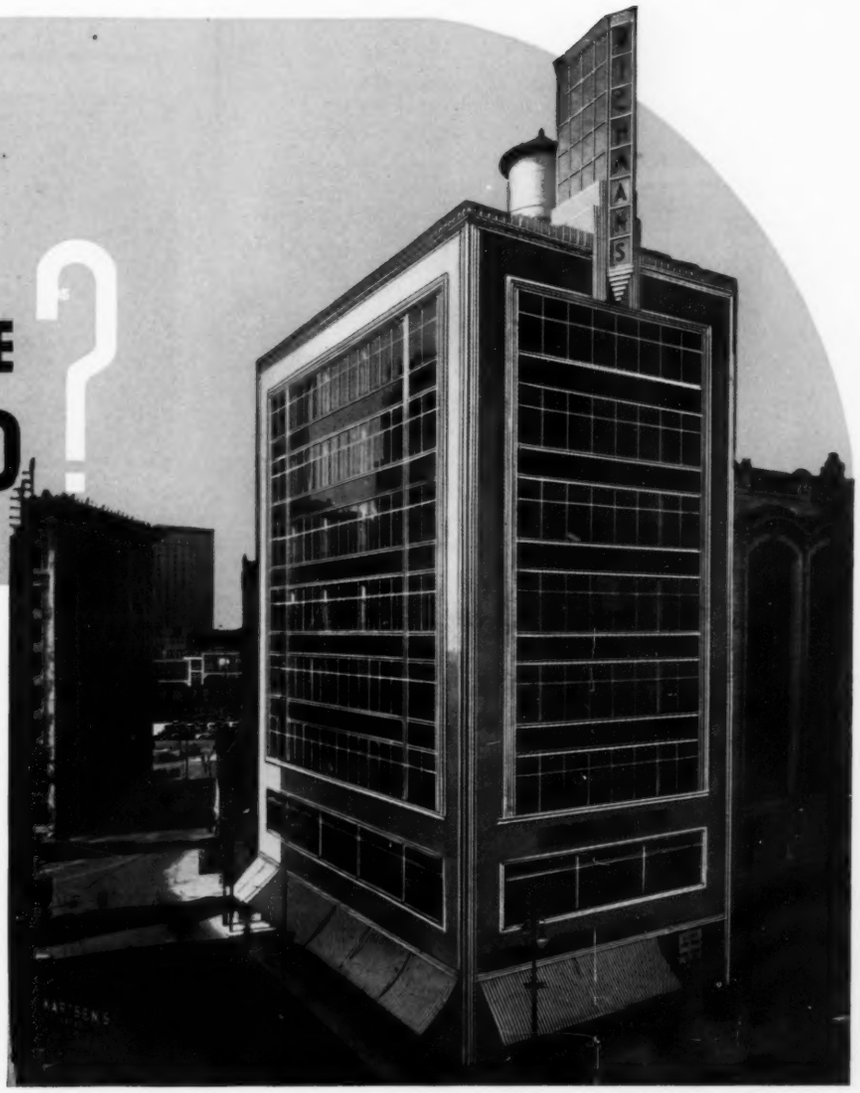
THE BROWN DECADES. A Study of the Arts in America: 1865-1895. By Lewis Mumford. Published by Harcourt, Brace and Company, New York City. 266 pages. 12 photographic plates. Price $3.

In this book Mr. Mumford brings to light America's Renaissance, the years immediately following the Civil War, and the pioneering that took place in the arts.

Beneath the insincere imitations of foreign styles which exemplify the popular bad taste of the post-war period, "a new life was stirring in departments of American thought and culture that had hitherto been barren, or entirely colonial and derivative." This simple, sturdy growth found its best expression in the architectural works of Richardson, Root, Sullivan and Roebling; in landscape restorations and improvements by Marsh, Olmsted and Eliot; and in the paintings of Eakins and Ryder. Similar trends in literature have been surveyed by the author in "The Golden Day."

To produce an architectural style appropriate to industrial usage from the existing chaos of heavy romanticism and embellishment was the problem confronting the architect of the day. Richardson exerted a powerful influence and laid the foundation of the tradition afterwards followed by Root and Sullivan; their work bears testimony to their understanding of the requirements of a building and its relation to society. Their successors, McKim, Mead and White, and Frank Lloyd Wright, comprise a direct link with contemporary development and ideals.

WHO CAN FABRICATE ENDURO?



Richman Bldg., Detroit, Mich.; Albert Kahn, Inc., Detroit, Mich., Architects; Otto Misch Co., Detroit, Mich., Contractors.

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The Richman Building, Detroit, is a fine example of co-operation between many fabricators. In this building Republic ENDURO was used for the exterior finish in Macotta blocks made by Maul Company, Detroit. Forming of the steel was performed by Murray Corp. of America, Detroit. Atlas Iron & Steel Company, Detroit, formed the bars and sheets that went into the most unusual and beautiful stairway. Windows and trim were produced by United Metal Products Co., Canton, Ohio. Elevator doors and trim were fabricated by W. S. Tyler Co., Cleveland. Moulding was formed by Kawneer Co., Niles, Mich.

The net result is a building of distinctive design, of unified decoration and permanent to the highest degree.

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EXHIBITIONS AND EVENTS

Until April 11	Exhibition of work by members of the American Union for New Architecture at the Hotel Winthrop, 47th Street and Lexington Avenue, New York City.
April 17-May 1	Annual exhibition of the Richmond Academy of Arts, Richmond, Va. Open to all artists native of or residing in Virginia. Address Secretary, 1110 Capitol Street, Richmond.
April 25-May 5	Exhibition of the Westchester County Society of Architects in connection with the second annual Westchester Home Show, county center, White Plains, New York.
April 26	Twelfth annual convention of the National Council of Architectural Registration Boards, Mayflower Hotel, Washington, D. C.
April 27-29	Annual convention of the American Institute of Architects in Washington, D. C.
May 26	Second annual meeting of the Porcelain Enamel Institute in Cleveland. Talks on architecture are scheduled. A new porcelain enamel on metal house will be open for inspection.
June 20-24	Annual meeting, in Atlantic City, of the American Society for Testing Materials.
June 25-August 19	Modern architecture tour of Europe, conducted by Prof. Talbot F. Hamlin of Columbia University. Address The American Institute of Educational Travel, 587 Fifth Avenue, New York City.
July 30-August 14	Exhibition of art at the Los Angeles County Museum in conjunction with the American Olympiad competition of sports buildings by architects of the nations invited to the Olympic games. Address Secretary, American Olympic Committee, 233 Broadway, New York City.
October	International Congress for Modern Architecture at Moscow, U. S. S. R. Program: "The Functional City."

COMPETITIONS

April 4-5	Preliminary examinations for Rotch Travelling Scholarship. Apply to C. H. Blackall, 31 West Street, Boston.
April 12	Closing date of competition for filling station design sponsored by The Architects' Emergency Committee, 115 East 40th Street, New York City.
April 20	Closing date for applications for Princeton prizes in architecture. Address the Director, School of Architecture, Princeton University, Princeton, N. J.
May 2	Closing date for final drawings in annual competition by the American Institute of Steel Construction for "the most beautiful steel bridge design."
June 15	Closing date for entries for Douglas Fir Plywood Manufacturers design competition. Address C. H. Alden, professional advisor, Skinner Building, Seattle, Wash.

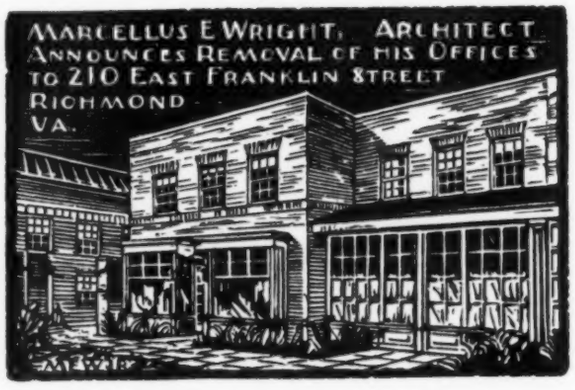
COMPETITION FOR UNEMPLOYED DRAFTSMEN

The architects' Emergency Committee of the Region of New York announces prizes aggregating $975 for plans of filling stations which will not mar the appearance of the countryside. Only unemployed architects and draftsmen living or working in the metropolitan district, and registered with the committee on or before April 2, are eligible to compete.

A first prize of $100, a second of $75, and a third of $50 and additional prizes of $25 each are offered.

Each entrant in the contest, which closes Tuesday, April 12, may submit only one design. Committee headquarters: 115 East 40th Street, New York.

ANNOUNCEMENTS



Dunn and Copper, architects, announce the opening of their new offices in the Hanna Building, Cleveland, Ohio.

Max A. Bernhardt, architect, has moved from 127 S. 18th Street to 721 Walnut Street, Philadelphia, Pa.

William Bernhard, architect, has moved from 232 East Erie Street, Chicago, to Eppraim, Wisconsin. A. Garey Lambert, having accepted a position with the architects for the Williamsburg Restoration, the firm of Baskerville and Lambert has been dissolved by mutual consent. Henry E. Baskerville and H. Coleman Baskerville will continue the practice of architecture under the firm name of Baskerville and Son, 2202 Central National Bank Building, Richmond, Virginia.

A group of registered architects of Chicago has recently formed the Architectural Guild of Small Home Design. Registered architects interested in small-house work costing less than $10,000 are invited to inquire of The Architectural Guild, 540 No. Michigan Avenue, Chicago.

The Cambridge School of Domestic Architecture and Landscape Architecture announces a summer session, June 27 to August 5. Address: 53 Church Street, Cambridge, Mass.

Rexford Newcomb, for the past fourteen years Professor of the History of Architecture at the University of Illinois, has just been appointed by the Board of Trustees of that institution as Dean of the newly established College of Fine and Applied Arts.

ANNUAL CONVENTION OF THE A.I.A.

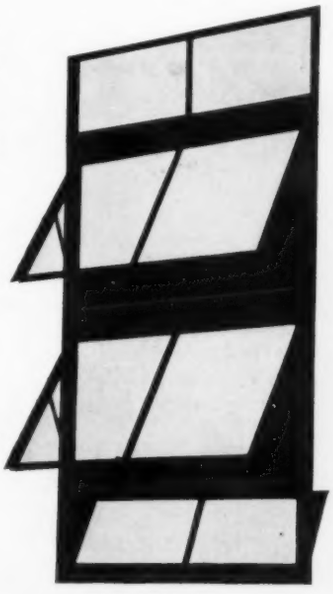
The American Institute of Architects will attack the national housing problem from the economic standpoint at its seventy-fifth annual convention on April 27, 28 and 29 in Washington, D. C.

The Producers' Council, affiliated with the Institute, and composed of sixty companies and associations of manufacturers in the field of building materials and appliances with a combined capital of $22,500,000,000, will also convene during the convention period. The Institute and the Council, it is explained, are actively cooperating to advance their common interests.

Columbia University Medical School, Bard Hall, New York, N. Y. Architect: James Gamble Rogers; Contractor: Marc Eidlitz & Son, Inc.

With a sill ventilator which tilts inward, serving as a self-contained windguard, and other ventilators which slide down from the top and open outward, the Fenestra Projected Fenmark Window provides the classroom with fresh air without draft; affords extraordinary weather protection even when wide open.

Add many other modern advantages, such as finger-touch operation, outside cleaning from within, more daylight, maximum opening when desired, and fire-safety. Then add the beauty of slender, graceful frames and muntins, set off by solid bronze hardware of attractive design and finish. The Projected Fenmark Window represents the sum of these features.



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FEATURES IN THE MAY ISSUE

A PORTFOLIO OF SHOPPING CENTERS . . . of which this village development for New Canaan, Connecticut, by Alfred Mausolff, architect, is characteristic. Many communities have found that grouped shopping facilities add to the physical betterment of the locality. An accompanying article suggests methods which architects in other towns or small cities may adopt as a basis for developing similar projects.

MODERNIZATION AND REMODELING . . . a series of articles and examples of old buildings converted to profitable new uses. These "before" and "after" views of a remodeled house on Long Island by George Fred Pelham, architect, illustrate the possibilities of modernization at small cost. Also included will be a presentation of two remodeled dwellings at Framingham Centre, Mass., by George F. Marlowe, architect; remodeled store buildings by F. P. Platt and Brother, architects; and a city residence made over as an apartment house, by Rodgers and Poor and L. B. LaFarge, architects.

In addition to these features . . . The prize-winning Rochester Bridge by Gehron and Ross . . . The Reed Memorial Library at Lake Forest, Ill., by Edwin H. Clark . . . A church at Aurora, Ill., by George G. Elmslie . . . Discussion of Current Problems by Architects . . . News of Architectural Clubs and A.I.A. Chapters . . . Building Trends.

AMONG THE CONTRIBUTORS IN THE PRESENT ISSUE

JAMES FORD is executive director of Better Homes in America.

Professor JEAN-JACQUES HAFFNER teaches architecture at Harvard University. He is a winner of the "Grand Prix de Rome."

CARL T. WASHBURN is a civil engineer specializing in stadium design.

N. A. OWINGS is development supervisor for a Century of Progress, Chicago.

PHELPS DODGE COPPER PRODUCTS CORPORATION

The Phelps Dodge Copper Products Corporation will specialize in the manufacture and sale of products made from copper mined by Phelps Dodge Corporation.

It has taken over and is now operating the following fabricating units as divisions:

American Copper Products Division, with mills at Bayway, N. J., manufacturers of copper rods, wire and strip, bus bars and special shapes, stranded cables, trolley wire, bronze and brass wire, and weather-proof wire.

British American Tube Division, with mills at Bayway, N. J., manufacturers of condenser tubes, brass, bronze and copper tubes and pipe.

Inca Manufacturing Division, with mills at Fort Wayne, Indiana, and Los Angeles, California, manufacturers of enameled copper wire, coils and magnet wires.

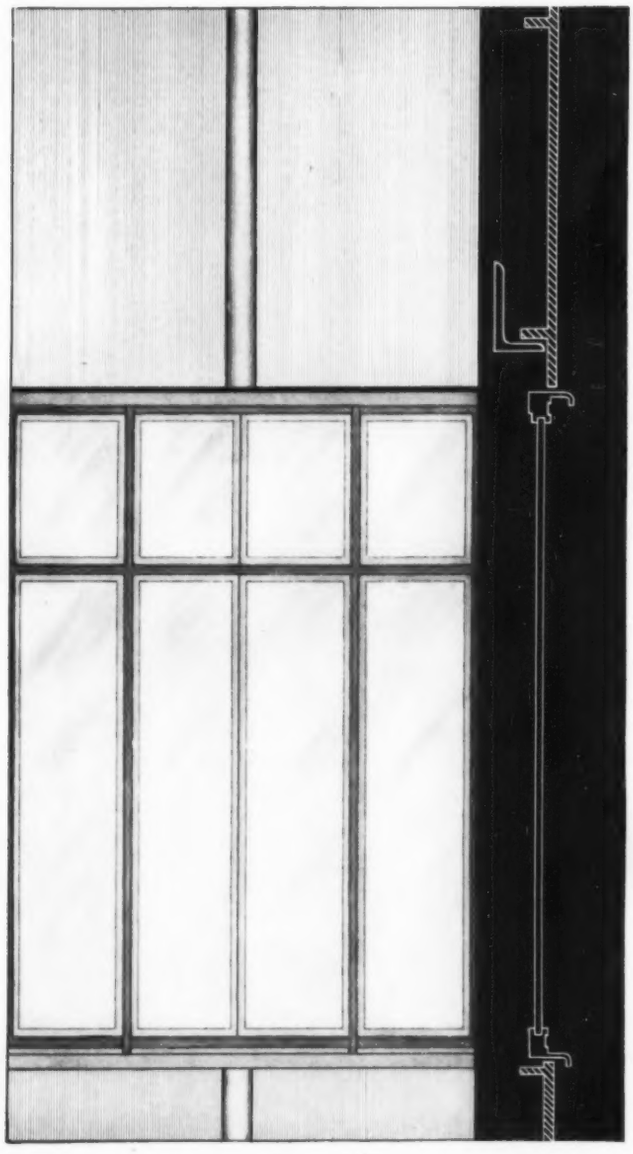
P-M-G Metal Division, with mills at Bayway, N. J., manufacturers of copper and copper alloy products having special corrosion resisting qualities and high physical properties.

Habirshaw Cable and Wire Corporation will maintain its separate corporate existence and will be operated as a subsidiary of Phelps Dodge Copper Products Corporation. With mills at Yonkers, N. Y., and Bridgeport, Conn., it manufactures rubber and lead covered copper wire, paper and varnished cambric insulated power cables, telephone and telegraph wires, signal wires, Parkway cables and miscellaneous cables of all kinds.

The general offices of Phelps Dodge Copper Products Corporation and of Habirshaw Cable and Wire Corporation are at *40 Wall Street, New York, N. Y.*

Wylie Brown, *President*

Phelps Dodge Copper Products Corporation



At left, note how assembly of spandrels and windows of Alcoa Aluminum allows rapid erection—assures complete weather protection.

City Hall and Court House, St. Paul, Ramsey County, Minnesota. Architect: *Ellerbe & Co.*, St. Paul; *Holabird & Root*, Chicago, Associates; General Contractor: *Foley Brothers, Inc.*, St. Paul; Sub-Contractor on Aluminum: *Coleman Bronze Co.*, Chicago.

Alcoa Aluminum's soft color attracted them

... *its low maintenance cost was important*

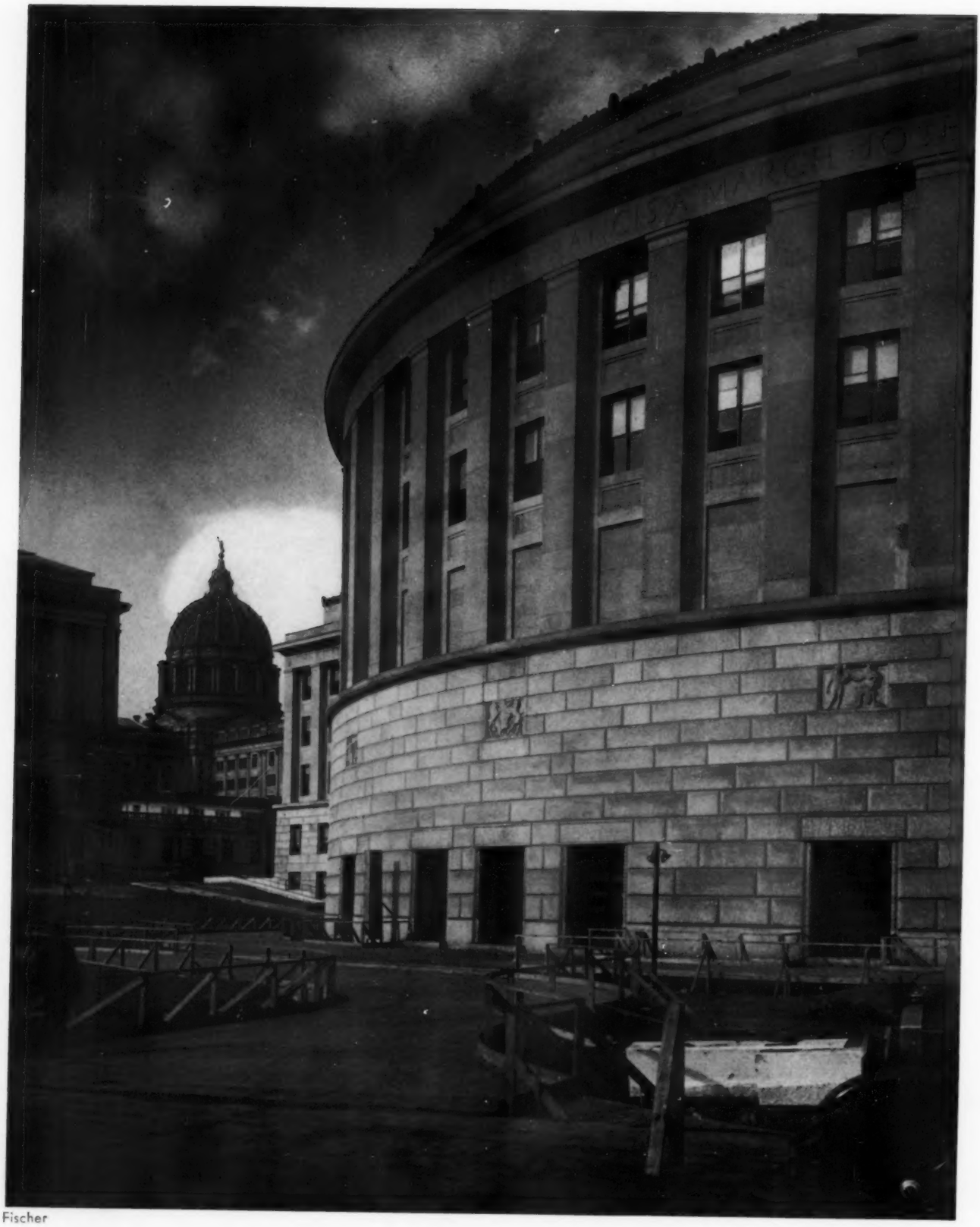
Rich gray in color, both the cast spandrels, and the windows which are made from extruded shapes, blend with the stone facade. Rust proof, corrosion resistant, non-staining, requiring no painting and having all the strength yet only 1/3 the weight of parts made of other structural metals! These genuine advantages tell why spandrels and windows of Alcoa Aluminum were used in St. Paul's new Ramsey County Court House and City Hall.

In this case, 879 spandrels, 522 fixed sash, 529 fixed transoms and 494 windows of Alcoa Aluminum were used. To further insure the stone facade against stain, Alcoa Aluminum was used as anchorage supports for the mullions. In addition, the base shoe, window screens and toilet stall doors were made of this modern metal.

The distinctive advantages of Alcoa Aluminum recommend it for an increasing number of uses. To obtain absolutely satisfactory architectural aluminum, specify Alcoa Aluminum and its alloys, made by Aluminum Company of America. In planning the use of Alcoa Aluminum in your next building project, we urge you to accept the cooperation of our representatives.

ALUMINUM COMPANY *of* AMERICA; 2467 Oliver Bldg., PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM



Fischer

ENTRANCE TO FORUM OF EDUCATION BUILDING
CAPITOL PARK, HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

THE ARCHITECTURAL RECORD APRIL, 1932 VOL. 71—NO. 4

THE STATE EDUCATION BUILDING, HARRISBURG

WILLIAM GEHRON and SIDNEY F. ROSS are the architects of the Educational Building.

ERIC GUGLER and RICARD BROOKS, designers and painters of the murals and the ceiling of the Forum.

LEE LAWRIE, sculptor of the bronze gates and doors.

C. PAUL JENNEWEIN and HARRY KREIS, sculptors of the carved panels and the modeled decoration.

VINCENT MARAGLIOTTI, painter of entrance lobby ceiling.

The Education Building is one of five buildings that will form the Capitol group of the Commonwealth of Pennsylvania at Harrisburg. In 1916, when the present Capitol Park development was planned by Arnold Brunner, architect, the Capitol Building (completed in 1906) was taken as the focal point around which the other buildings were to be grouped. On the east the Capitol is flanked by the new North and South Office Building, connected by a U-shaped terrace and forming the inclosure for a great stone paved forecourt. The Educational Building, the third and largest so far constructed, together with the proposed new Finance Building and the Soldiers and Sailors Memorial Bridge will complete the development as planned.

The Education Building was designed to house the various activities of the Department of Public Instruction, also to express its purpose and at the same time to be in itself an instrument of education.

The exterior of this building has been designed in a simplified classic architecture, to harmonize not only with the Capitol but also with the pylons of the Soldiers and Sailors Memorial Bridge; this treatment is also in keeping with the simpler tastes of today as compared with the period when the Capitol was built. The building was, therefore, planned with a minimum of moldings and architectural ornament. Wherever ornament or detail exists it is intended to symbolize something in particular or to stimulate the imagination.

Sculptural Designs

Bronze grilles at the main entrances symbolize the many different activities of modern man, whether he labor by hand or by mind. The farmer is represented with the plow, the banker with the dollar, cent and per cent signs, the artist with the palette, and so on. The bronze doors at the entrance of the Forum represent man's creative and recreative occupations: here the Fable, the Circus, and the Mythological Tale are recognized, and Art, Poetry, Music, the Drama, Science and Philosophy find their place.

The stone frieze on the exterior of the building has inscribed on it the names of the thirty-five educators, philanthropists and statesmen who have rendered outstanding service to education within the commonwealth.

The Main Lobby and Ceiling

An expansive ceiling illustrates the rich symbolism of the interior: here the visitor is enjoined to "learn" the arts, sciences and handicrafts.

Thirteen beams span the room, alternately pictorial and decorative. Beginning at the east the first pictorial beam represents sports and diversions, golf, swimming, baseball, tennis and football, with similar representations of other sports depicted on the surrounding panels. Two inscriptive panels adjoin, one of which urges the development of humanitarian purposes, and the other represents the essentials of sport and play.

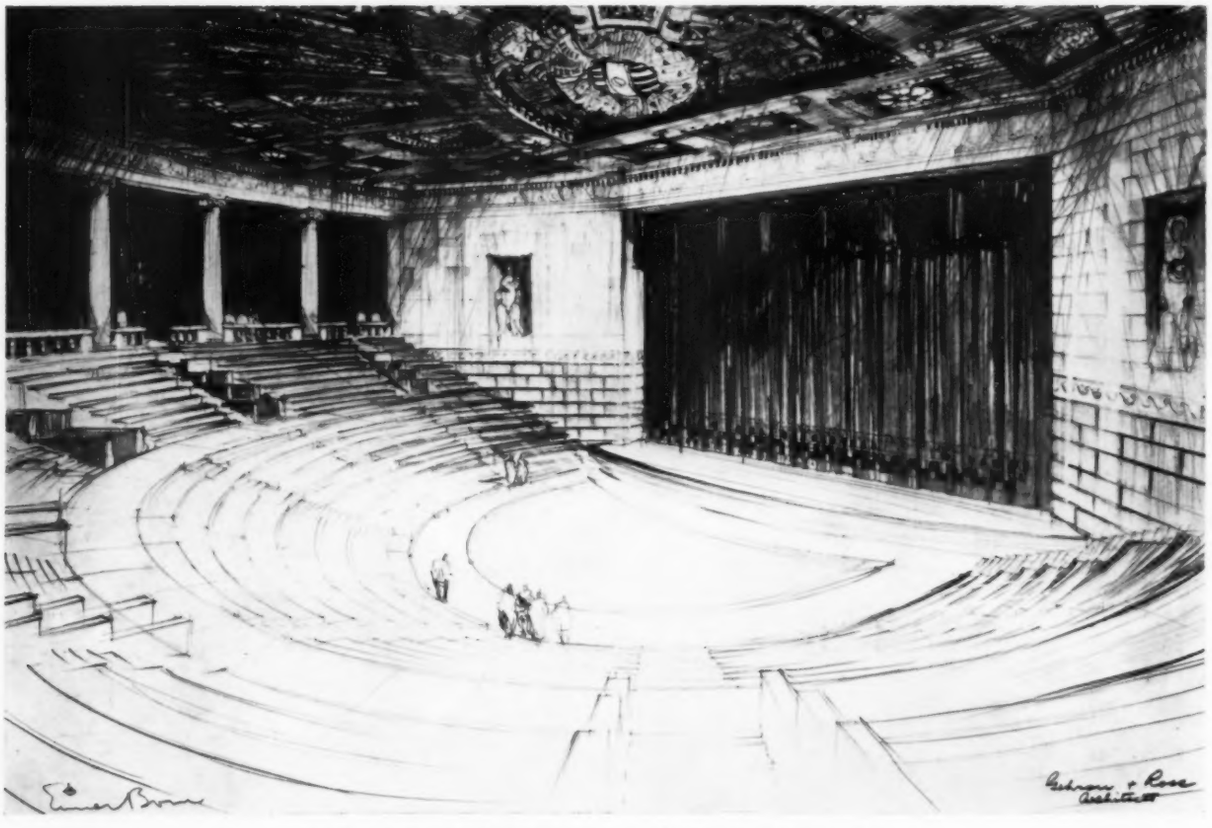
The second pictorial beam is devoted to the Arts. In the classical dress and form, architecture, sculpture, painting, literature, drama, music, the dance, poetry and oratory are shown, with the injunction to create.

The third beam is representative of the sciences of education, medicine, mathematics, astronomy, physics, mechanics and biology, with panel inscriptions sharing the learning of the sciences with the importance of discovery.

The fourth beam is divided between religion and

Gilkison

South elevation.



Early study of the Forum — rendering by Ernest Born.

EDUCATION BUILDING AT HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

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Detail of blue and white ceiling in entrance lobby.

EDUCATION BUILDING AT HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

philosophy showing scenes of mercy, forgiveness, faith, and justice, with inscriptive panels emphasizing the virtues of obedience and belief, of reason and doubt.

The fifth beam represents the commercial, agricultural and transportation phases of modern life. Scenes of banking, farming, and of road, rail, air and marine transportation are shown. The adjacent inscriptive panel enjoins one to sow, to reap, to trade, to market and to save.

The sixth and last beam is devoted to industry with special emphasis on those for which Pennsylvania is famous. Here are depicted a coal mine, a typical factory workman, steel workers, blacksmiths and bridge erectors, with the injunction to learn, to build, to serve and to share.

In the main entrance lobby are five openings with carved jambs representing the various branches of learning, such as geography, astronomy, literature, physical culture, music, sculpture and painting, zoology, history, botany, physics and chemistry. The sculptors, Paul Jennewein and Harry Kreis, have attempted to show from what widely divergent sources original knowledge of each subject has come.

The Forum

The Forum, as the name implies, was planned so that there could be free discussion not only from the stage but from any part of the amphitheater. This was considered important because of its specialized use.

The room is semi-circular in plan with a colonnaded promenade in the rear. On the circular walls of the promenade are map paintings and chronological tables alternately arranged covering the history of the world from the dawn of civilization to the present era. Beginning at the west

end of the arc with the ancient occidental civilizations and at the east end with those of the orient, they portray step by step the gradual development of civilization, meeting at the center of the arc in the rear, in the fourteenth year of the twentieth century. Here are recorded the important epochs and events of historic man.

Beginning the oriental culture with the early Chinese, the chronology passes through that of the Aryan, the Indian, the Japanese, the Korean and the Mongolian. Beginning the western civilization with the early Egyptian, it passes through the Babylonian, the Chaldean, the Sassanian and the Greco-Roman.

Toward the center, later times are represented. In recent times the histories of the Western World and Oriental World are merged and the center of the arc is taken up with representations of culture down to 1914.

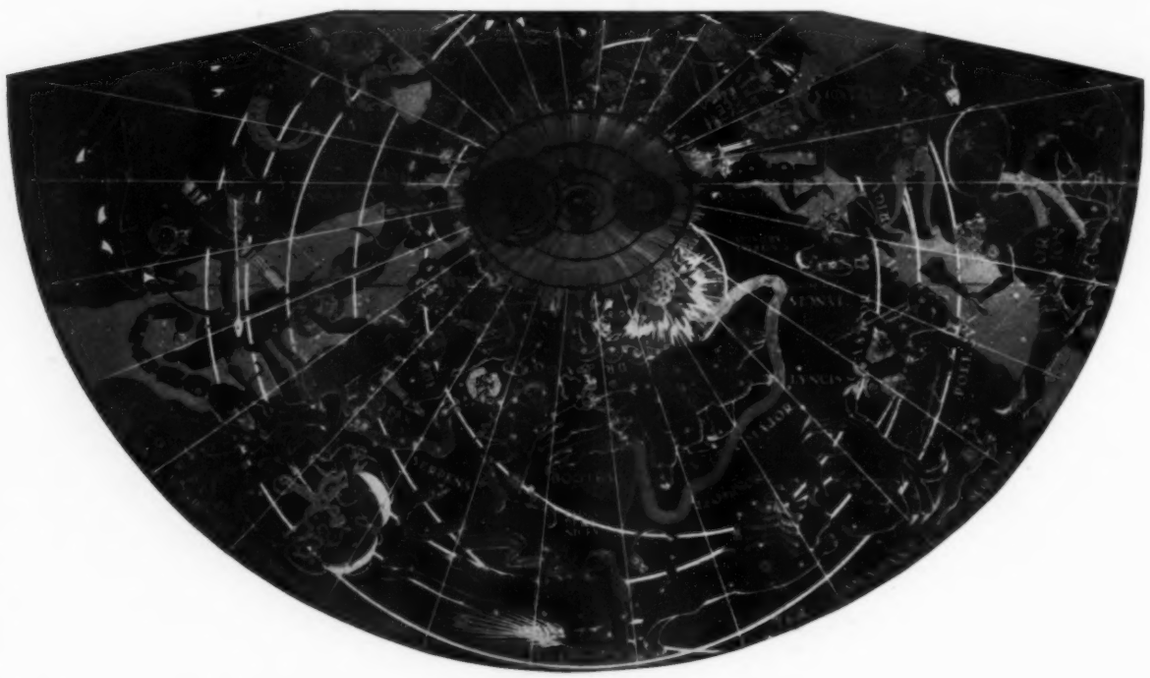
The Ceiling Painting

The ceiling painting by Eric Gugler and Ricard Brooks consists of a representation of the heavens, and on it are pictured mythological figures representing the various constellations. More than a thousand stars are designed in their proper positions. Three hundred and eighty-five illumination in graded brilliance, according to their respective magnitude.

In painting the ceiling of the Forum, the designers have made an effort to achieve some idea of the grandeur of the heavens. By projection, the relative positions of stars have been accurately ascertained by astronomers. The stars are in four magnitudes shown in the proper relationship to the celestial bodies to which they belong. Around the frieze the names of the constellations are so placed, as are also the major stars, that they can readily be found in the ceiling nearby.

The history of these constellations is unknown. From 6000 to 4000 B.C. is often quoted, but it is known that in the northern hemisphere the constellations were determined much as they are known today as early as 3500 B.C.

In the center of the ceiling is a sunburst which covers the air intake. On this sunburst is applied a design depicting the three theories of the solar system: the Ptolemaic of the second century which held the earth to be the center of the solar system, the Copernican which held the sun to be the center of the circular orbits, and the modern Keplerian theory recognizing elliptical orbits. These orbits are applied on the silver rays of the sunburst.



Ceiling painting in the Forum by Eric Gugler and Ricard Brooks. The figures are outlined in gold on a dark blue background. The radiating lines are gold and the orbits white. A silver sunburst with designs illustrating the three solar systems covers the air intake in the center of the ceiling.

EDUCATION BUILDING AT HARRISBURG, PENNSYLVANIA

GEHRON AND ROSS, ARCHITECTS

PORTFOLIO OF CURRENT ARCHITECTURE

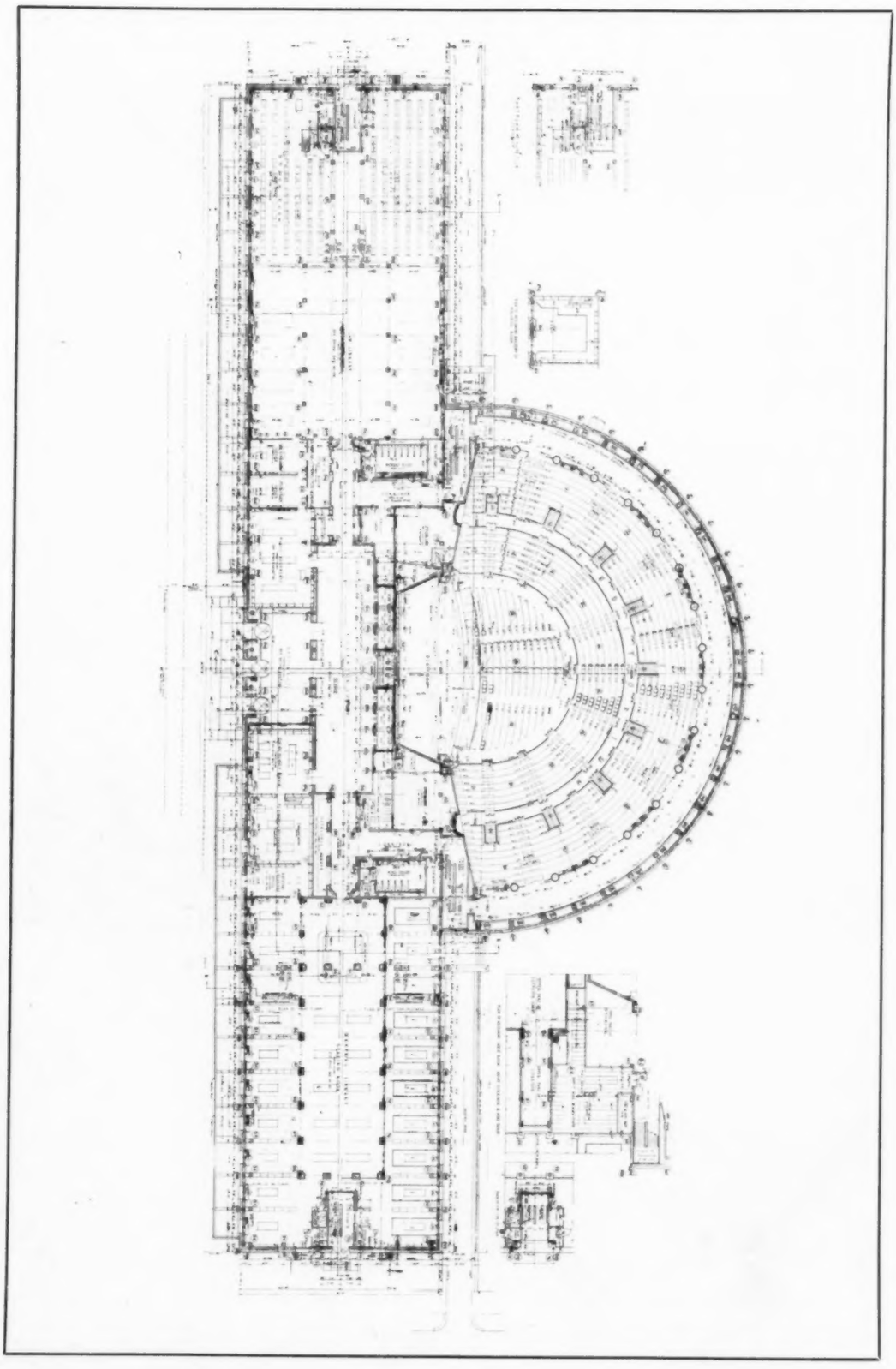
Fischer

FORUM IN THE EDUCATION BUILDING
CAPITOL PARK, HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

BUILDINGS ILLUSTRATED IN THIS PORTFOLIO

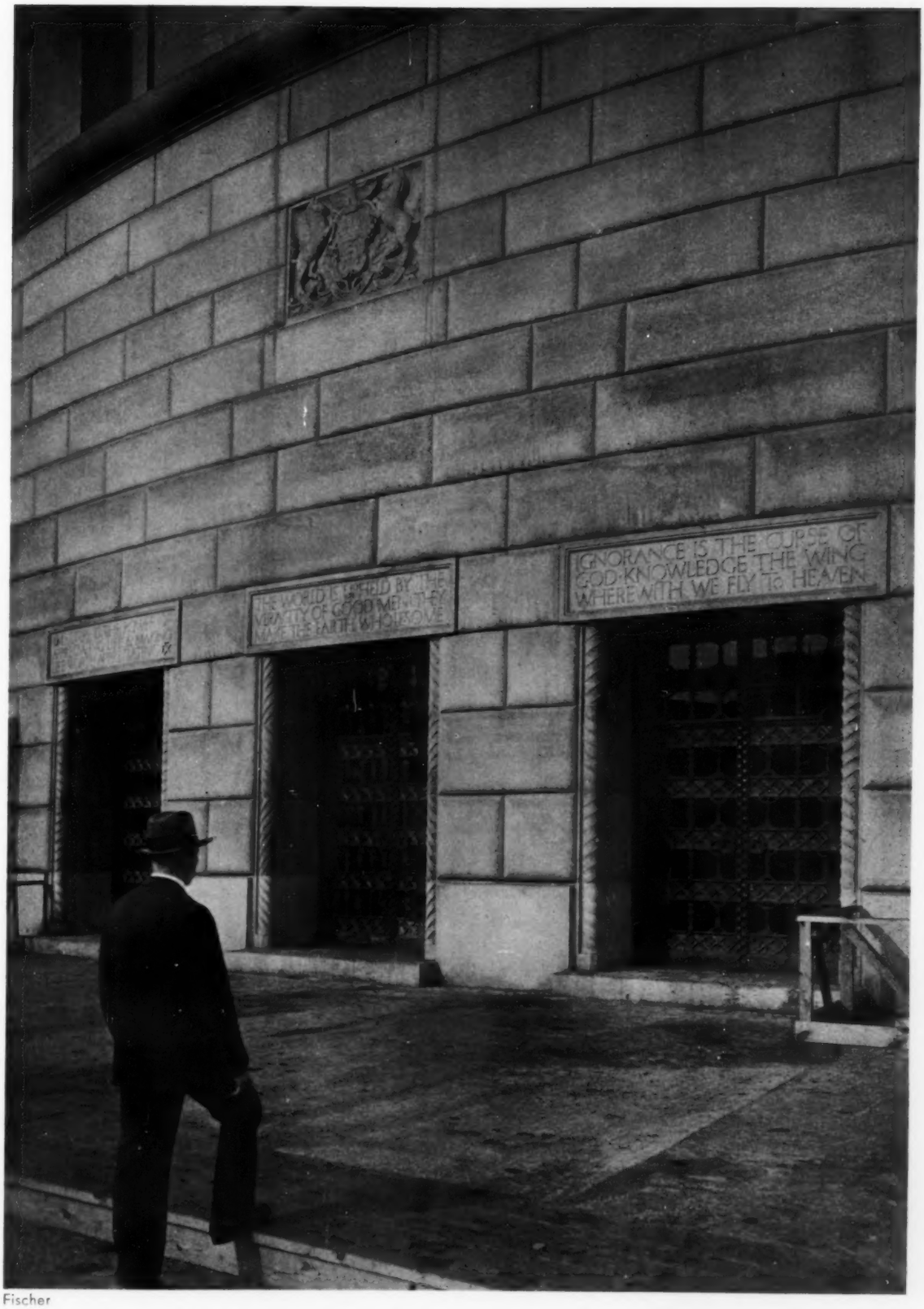
STATE EDUCATION BUILDING, CAPITOL PARK, HARRISBURG, PENNSYLVANIA — Gehron and Ross, Architects.

"THE BACHELORS," A HABERDASHERY OF HITE-BILICKE, LTD., LOS ANGELES — J. R. Davidson, Designer.



Ground floor plan.

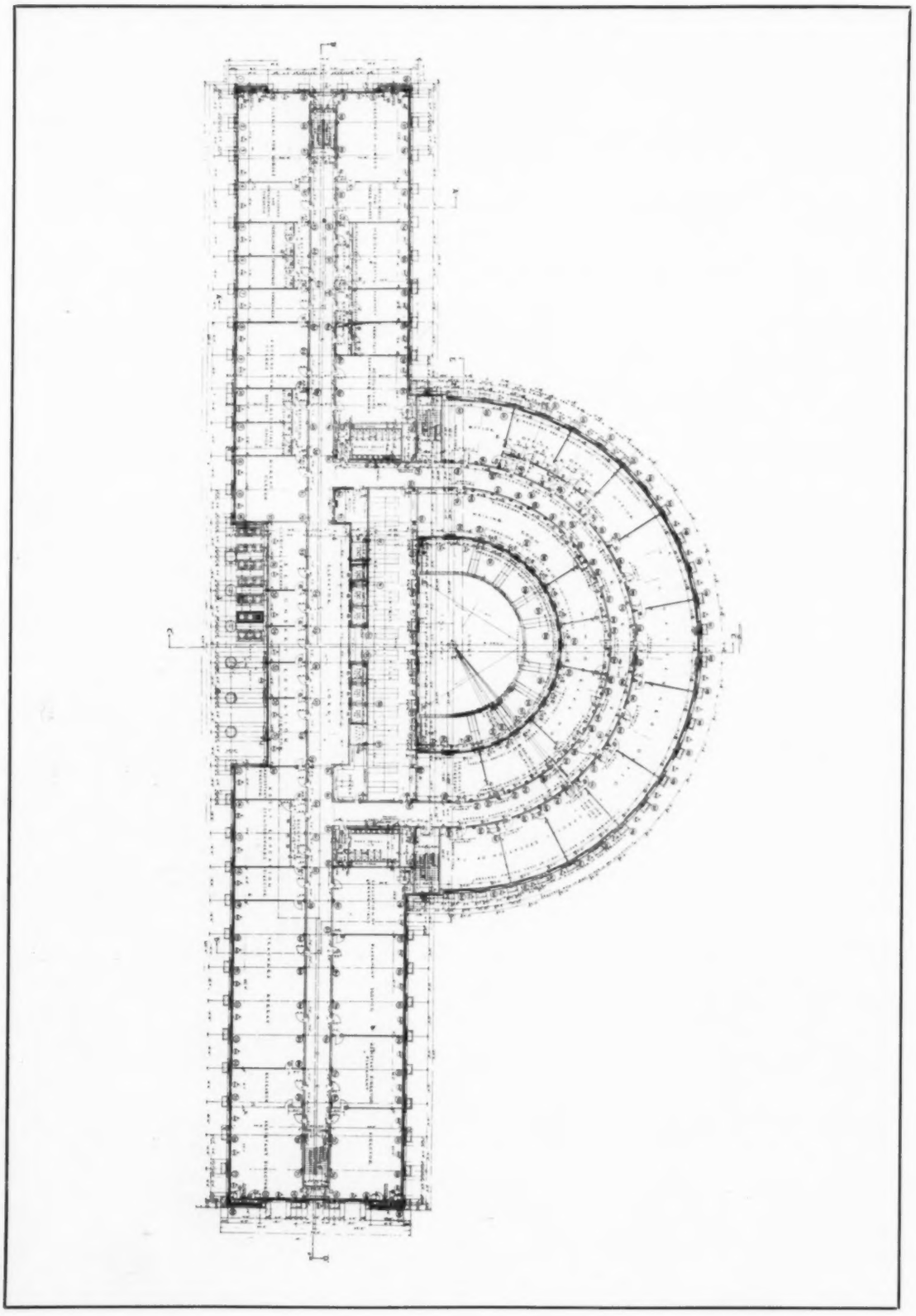
EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS



Fischer

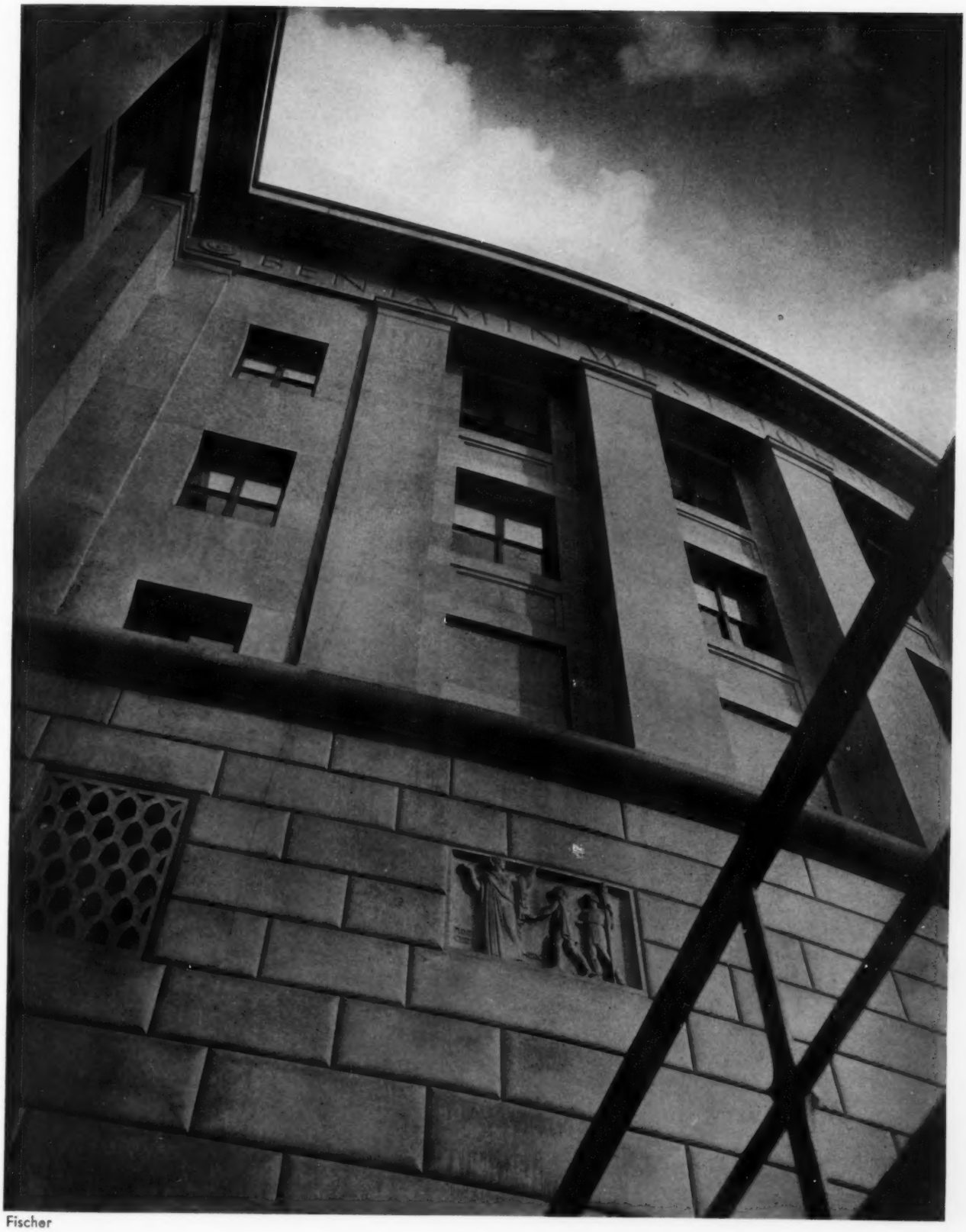
Entrance to Forum. Bronze doors by Lee Lawrie. Limestone panels by C. Paul Jennewein.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS



Office floor plan.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS



Fischer

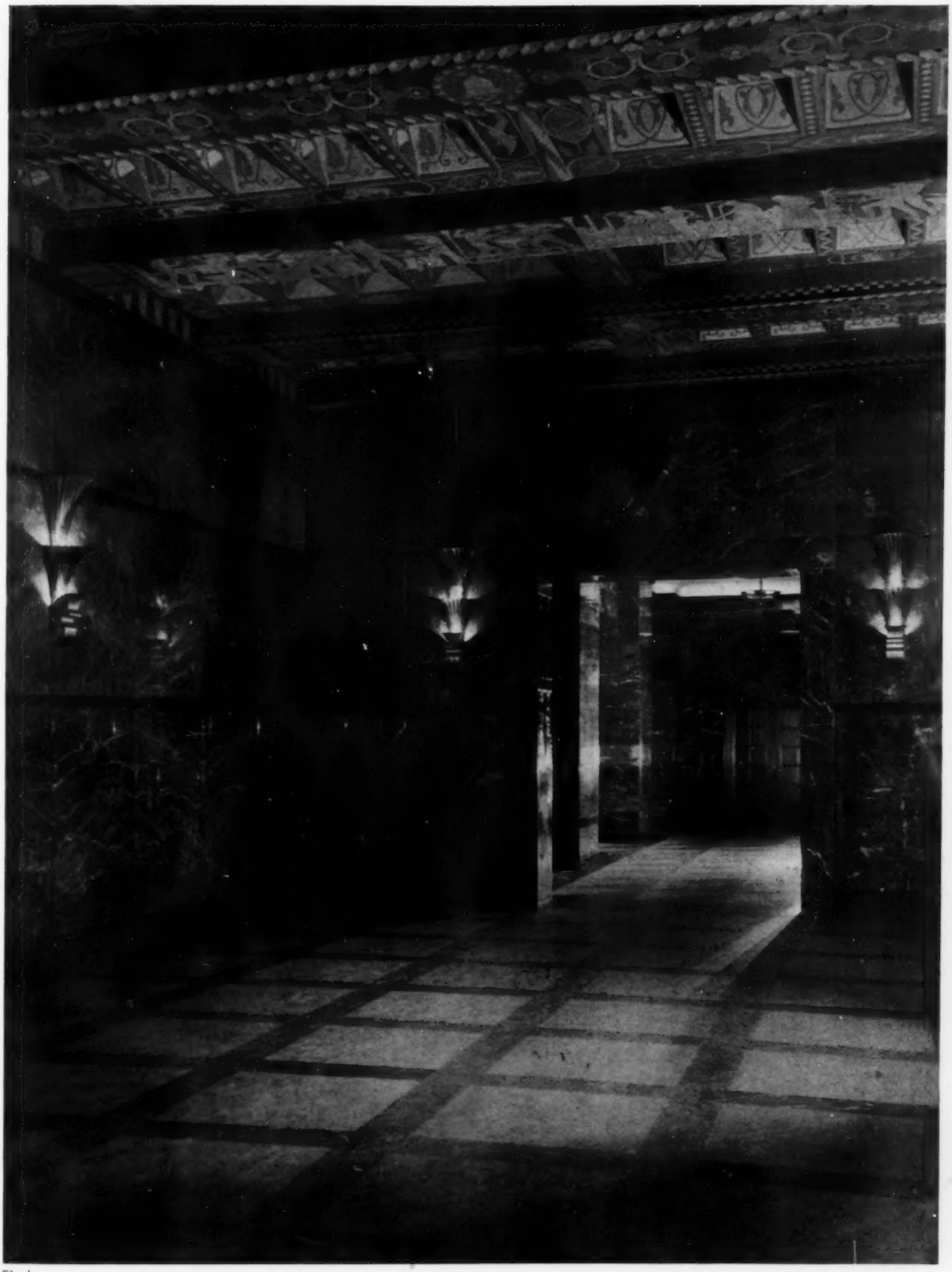
Detail of south elevation.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

Gilkison

Main lobby and information desk.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS



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East end of entrance lobby.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

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Colonnade at rear of Forum.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

Fischer

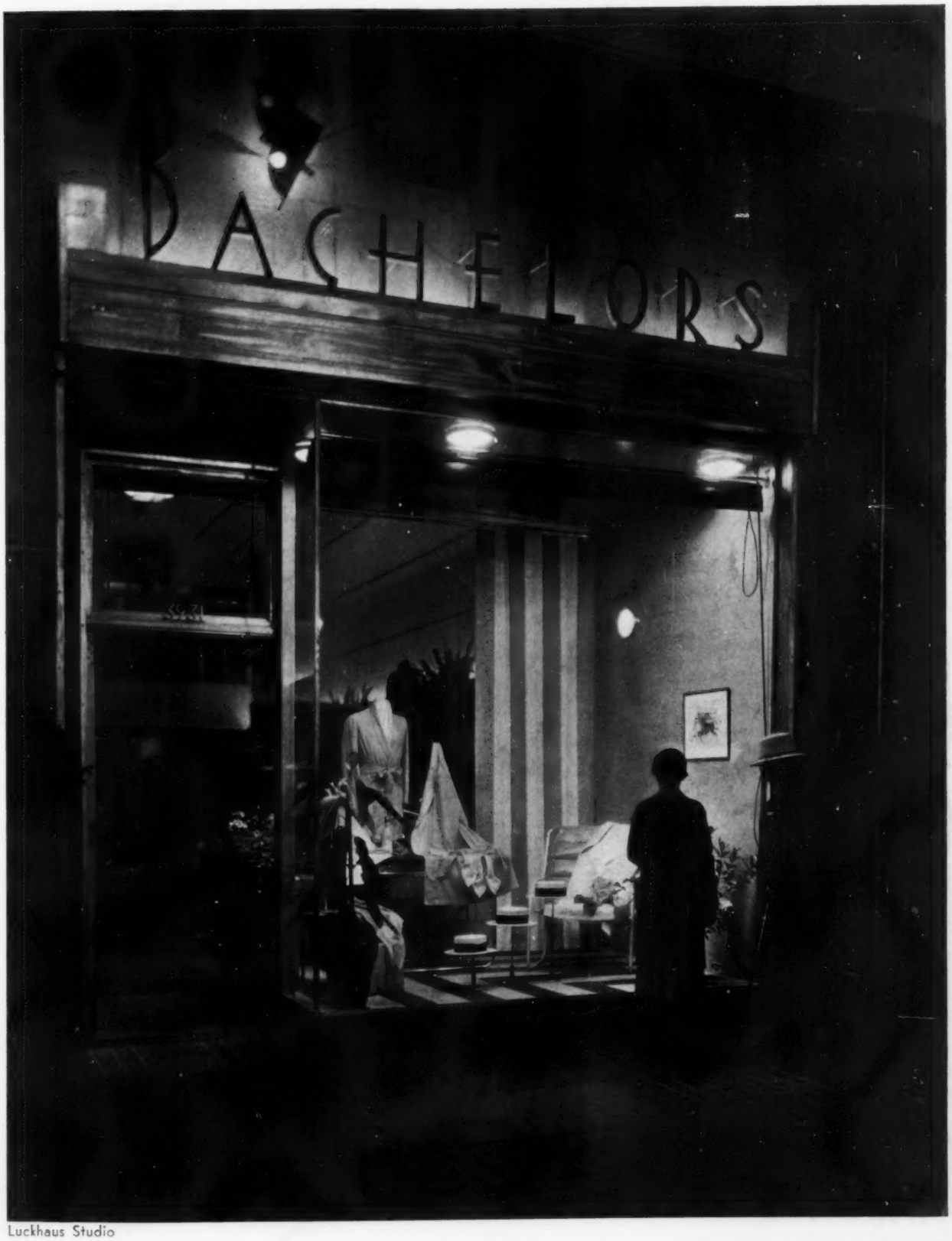
Detail of colonnade. Columns of polished terrazzo with brass strips.

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

Fischer

EDUCATION BUILDING
HARRISBURG, PENNSYLVANIA
GEHRON AND ROSS, ARCHITECTS

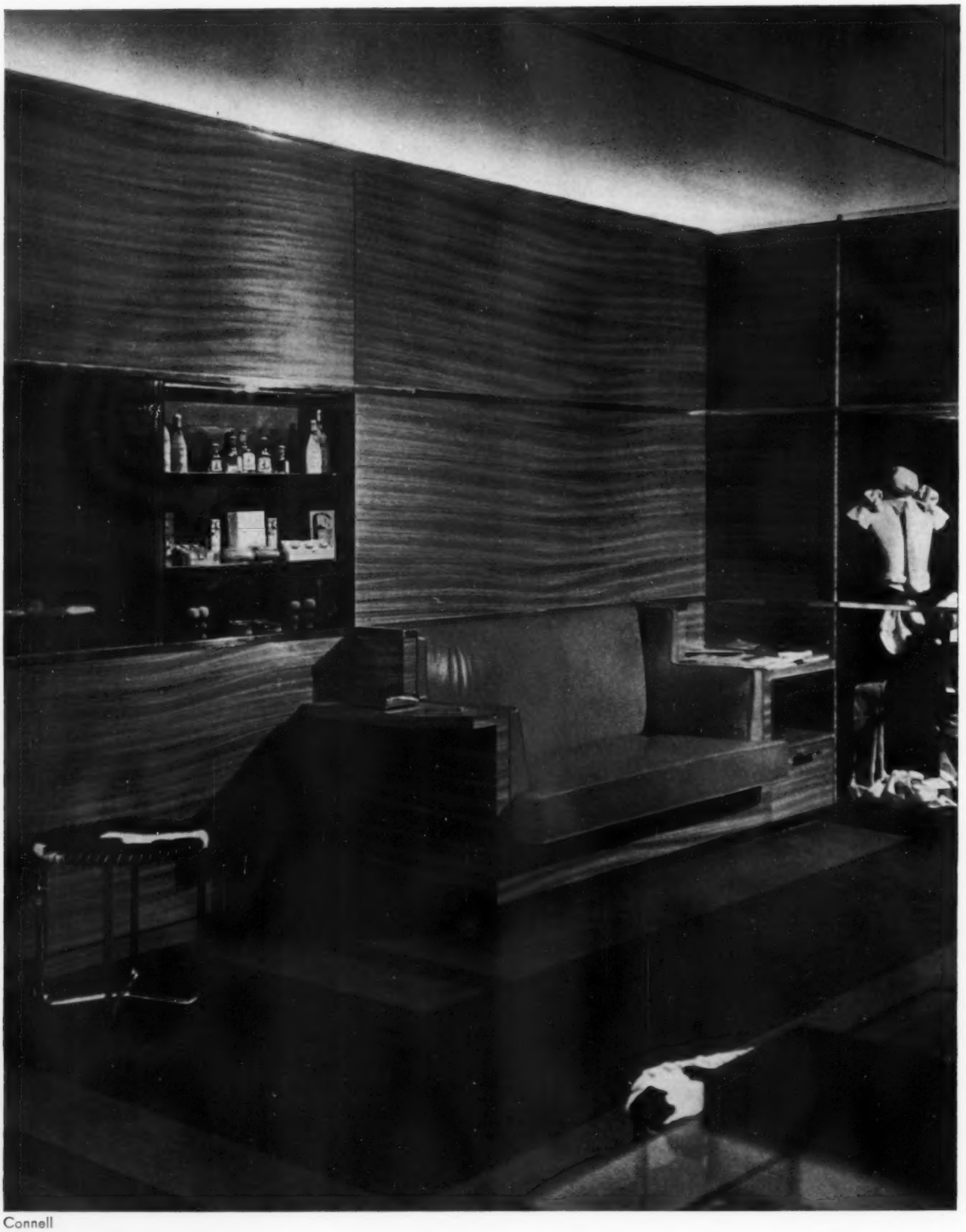
Promenade in Forum. The chronological tables and charts by Eric Gugler and Ricard Brooks are painted in black, white, old ivory and gold. Carpet in dark green.



Luckhaus Studio

The show window is treated as a stage with movable lighting fixtures and variable sets, curtains and "atmospheric" props.

"THE BACHELORS" — A HABERDASHERY
HITE-BILICKE, LTD., LOS ANGELES
J. R. DAVIDSON, DESIGNER



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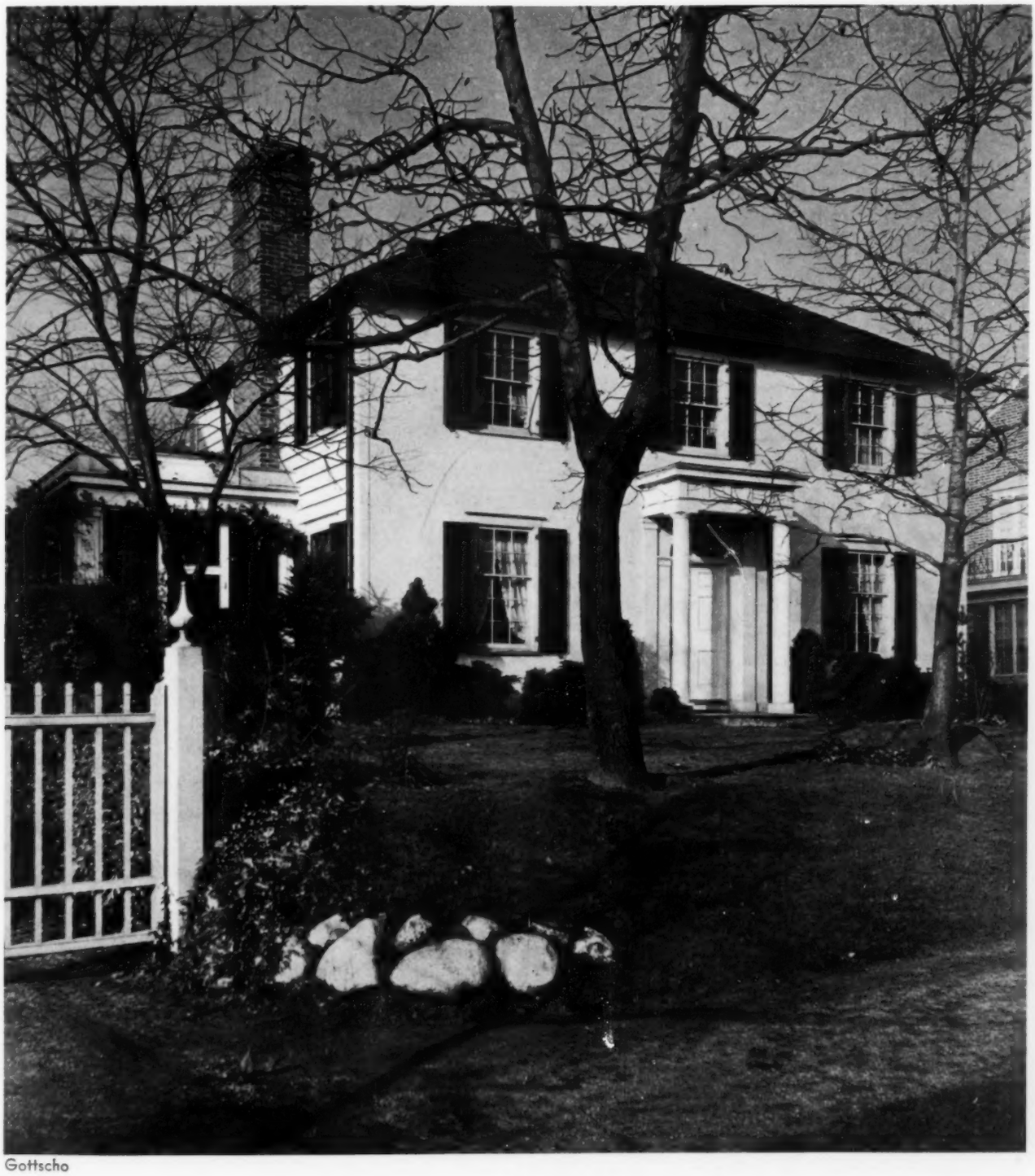
"THE BACHELORS"—A HABERDASHERY
HITE-BILICKE, LTD., LOS ANGELES
J. R. DAVIDSON, DESIGNER

Paneling in zebrawood, natural color and waxed. Polished aluminum strips. Built-in seat in light tan cowhide. Carpet in two tones of green.

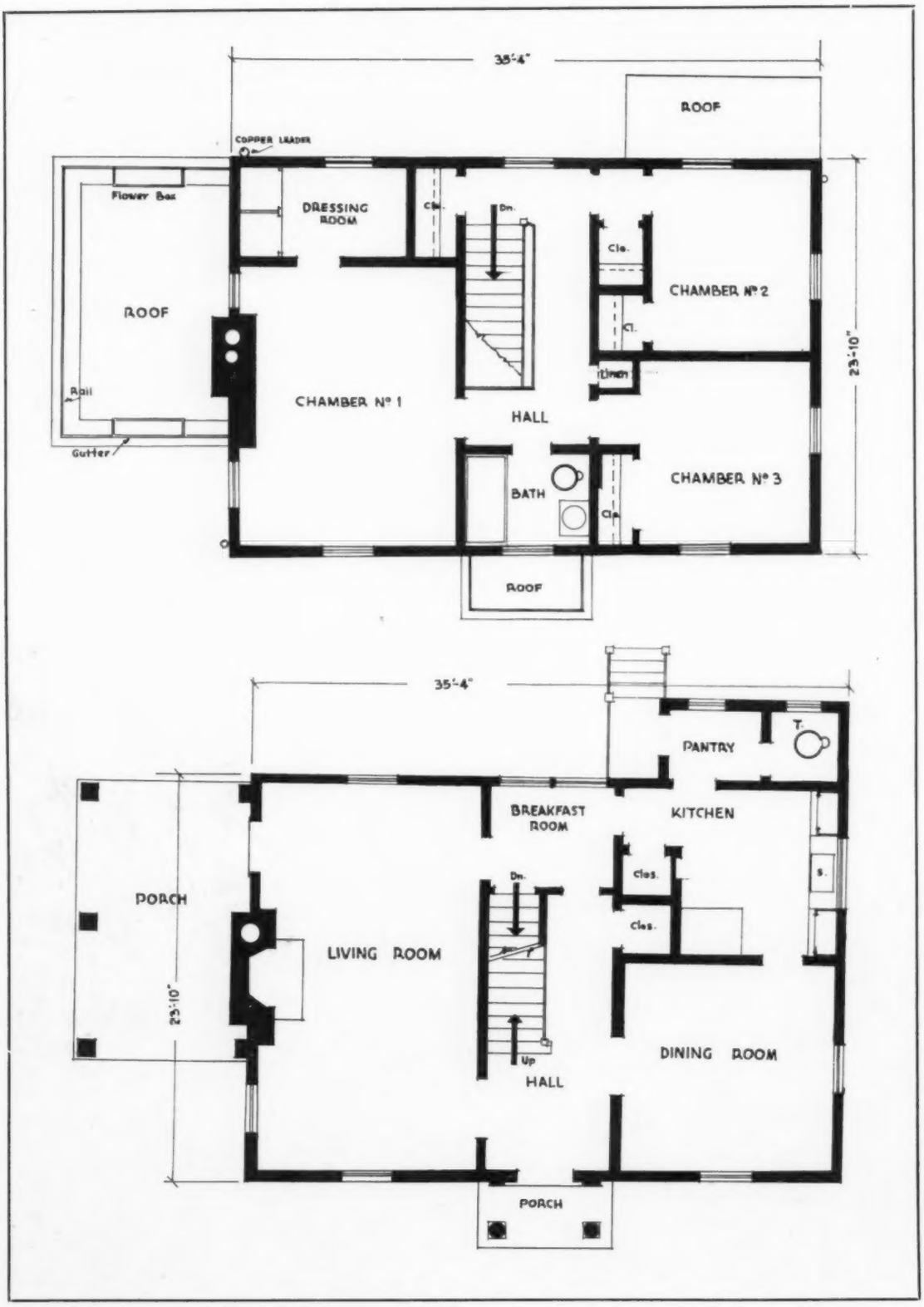
PRIZE-WINNING SMALL HOUSES

1931 "BETTER HOMES IN AMERICA" ARCHITECTURAL COMPETITION

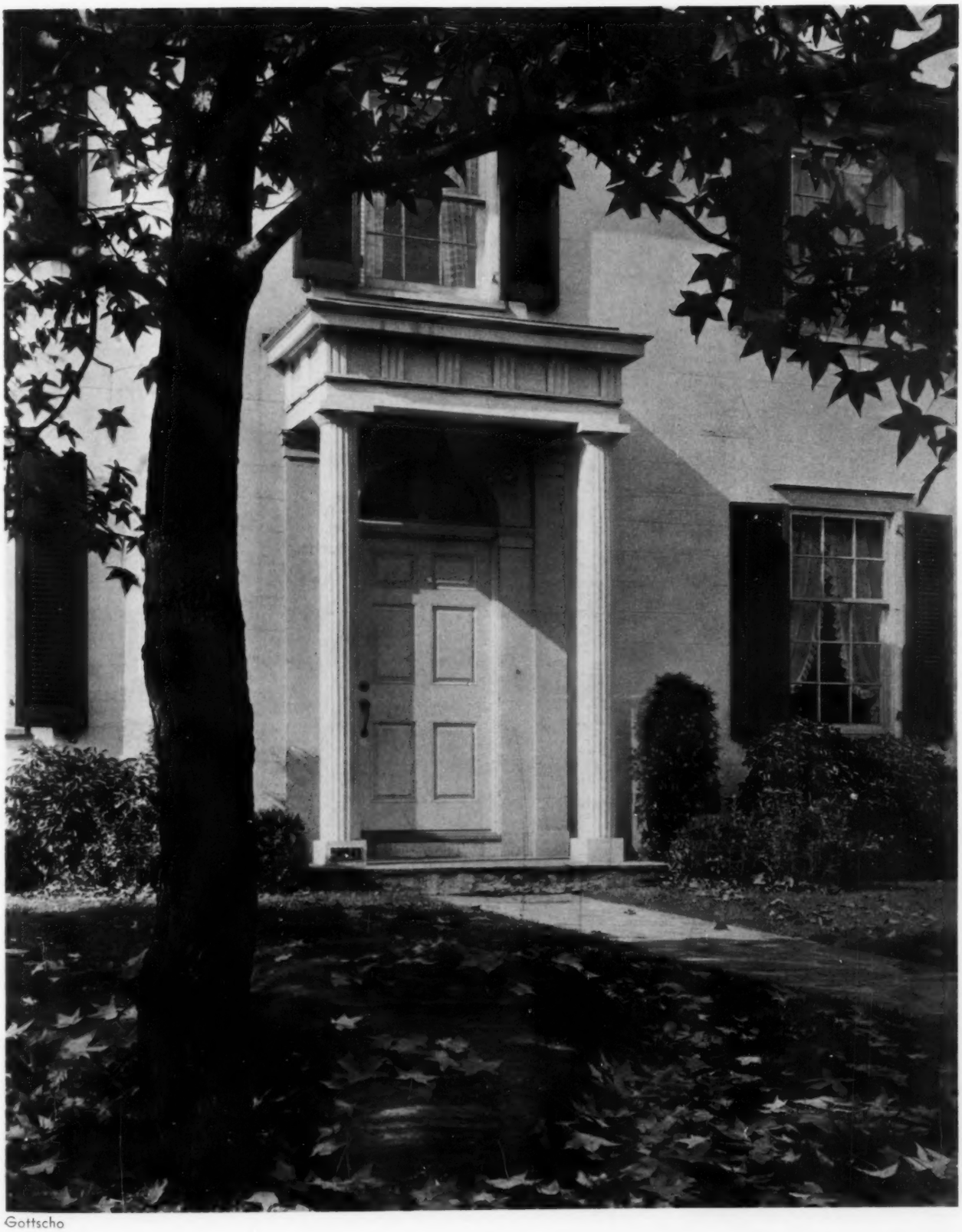


Gottscho

GOLD MEDAL — TWO-STORY CLASS
HOUSE OF FRANCIS COLLINS, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT



1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF FRANCIS COLLINS, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT



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1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF FRANCIS COLLINS, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Gottscho

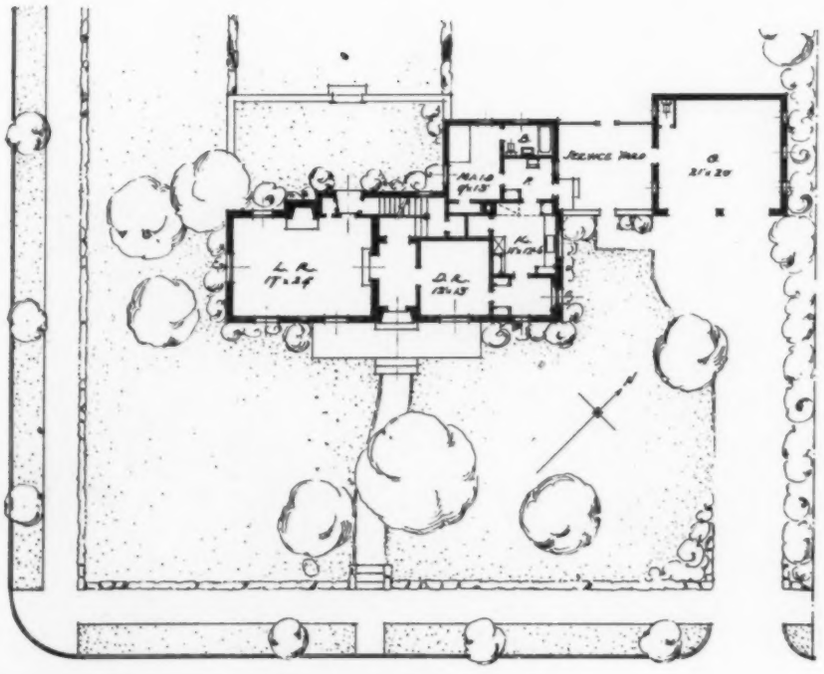
1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF FRANCIS COLLINS, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

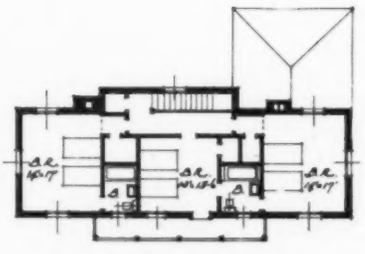
Collinge

Honorable Mention — Two-Story Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF W. E. RISSER, SANTA BARBARA, CALIFORNIA
WINSOR SOULE AND JOHN F. MURPHY, ARCHITECTS

Collinge





SECOND · FLOOR · PLAN ·

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF W. E. RISSER, SANTA BARBARA, CALIFORNIA
WINSOR SOULE AND JOHN F. MURPHY, ARCHITECTS

Gottscho

Honorable Mention — Two-Story Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF THOMAS McCALL, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

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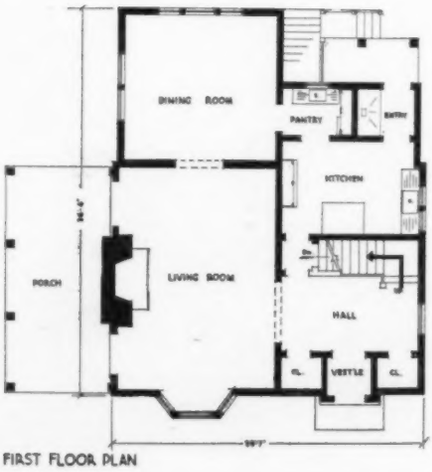


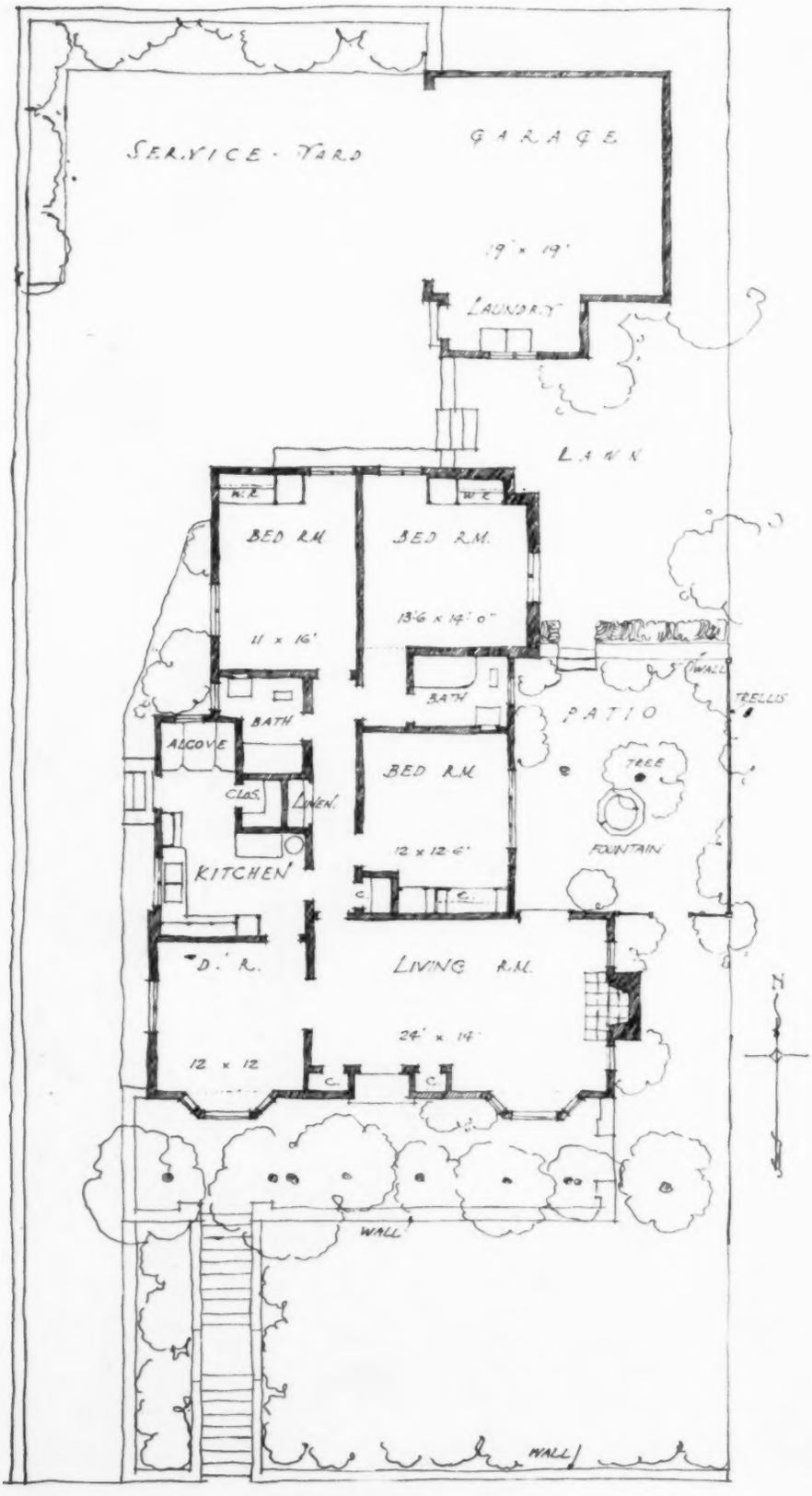
FIRST FLOOR PLAN

SECOND FLOOR PLAN

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF THOMAS McCALL, FIELDSTON, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Gold Medal — One-Story Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF STELLA SMITH, PALOS VERDES ESTATES, CALIFORNIA
WINCHTON L. RISLEY, ARCHITECT



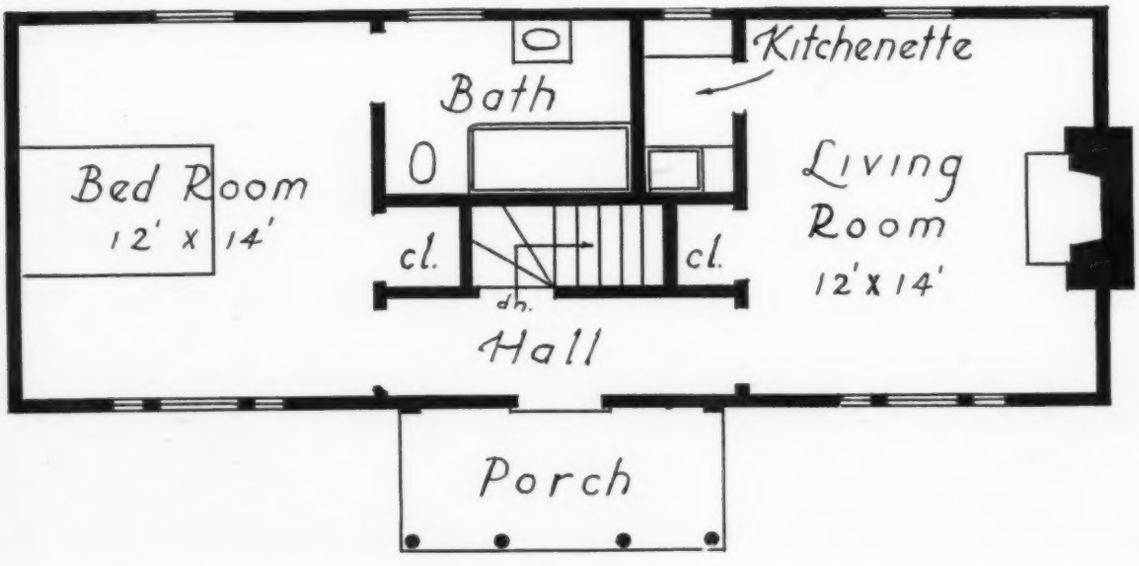
1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF STELLA SMITH, PALOS VERDES ESTATES, CALIFORNIA
WINCHTON L. RISLEY, ARCHITECT

Dreyer

Honorable Mention — One-Story Class

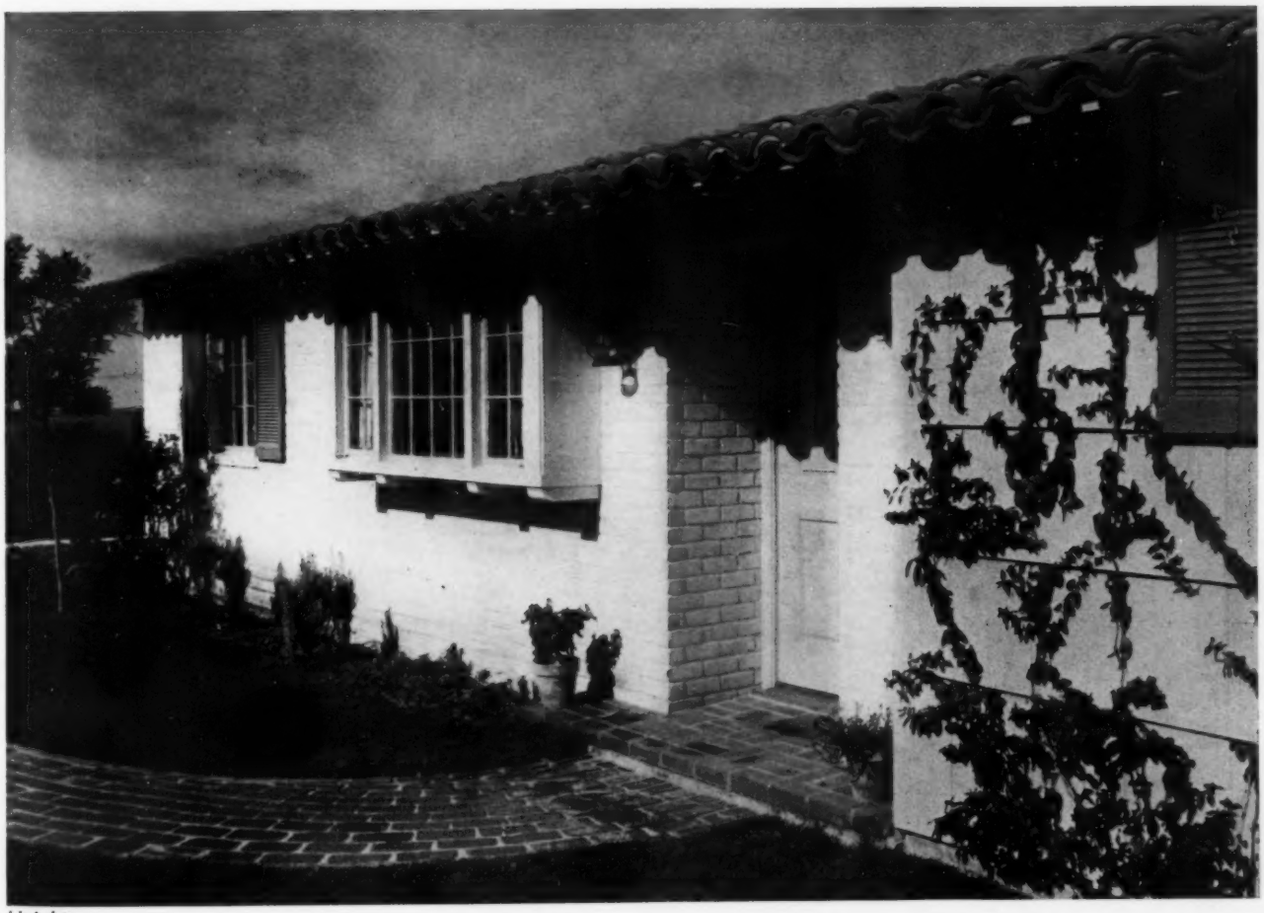
1931 BETTER HOMES IN AMERICA COMPETITION
GUEST HOUSE, ESTATE OF E. HOPE NORTON, DARIEN, CONNECTICUT
CHARLES S. KEEFE, ARCHITECT

Dreyer



1931 BETTER HOMES IN AMERICA COMPETITION
GUEST HOUSE, ESTATE OF E. HOPE NORTON, DARIEN, CONNECTICUT
CHARLES S. KEEFE, ARCHITECT

Haight

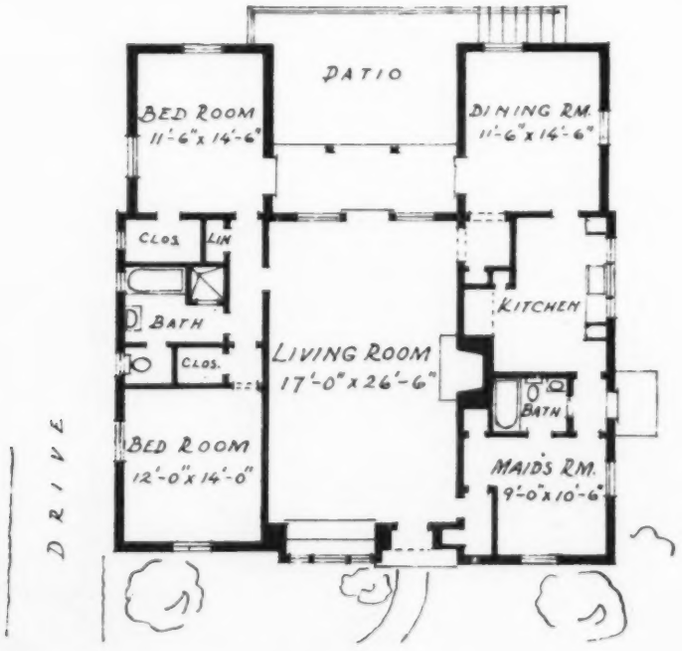


Haight

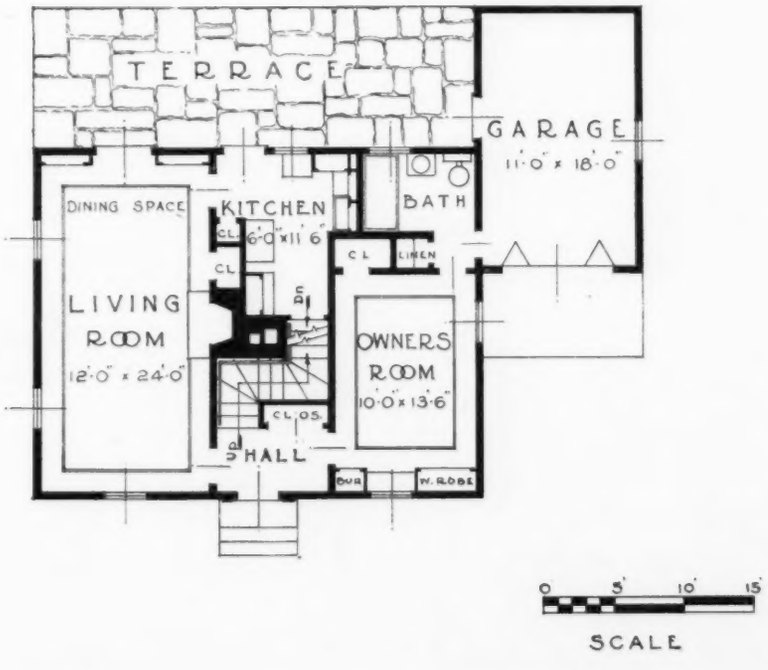
Honorable Mention — One-Story Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF GILBERT BLOSS, PALOS VERDES ESTATES, CALIFORNIA
H. ROY KELLEY, ARCHITECT

Haight



1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF GILBERT BLOSS, PALOS VERDES ESTATES, CALIFORNIA
H. ROY KELLEY, ARCHITECT



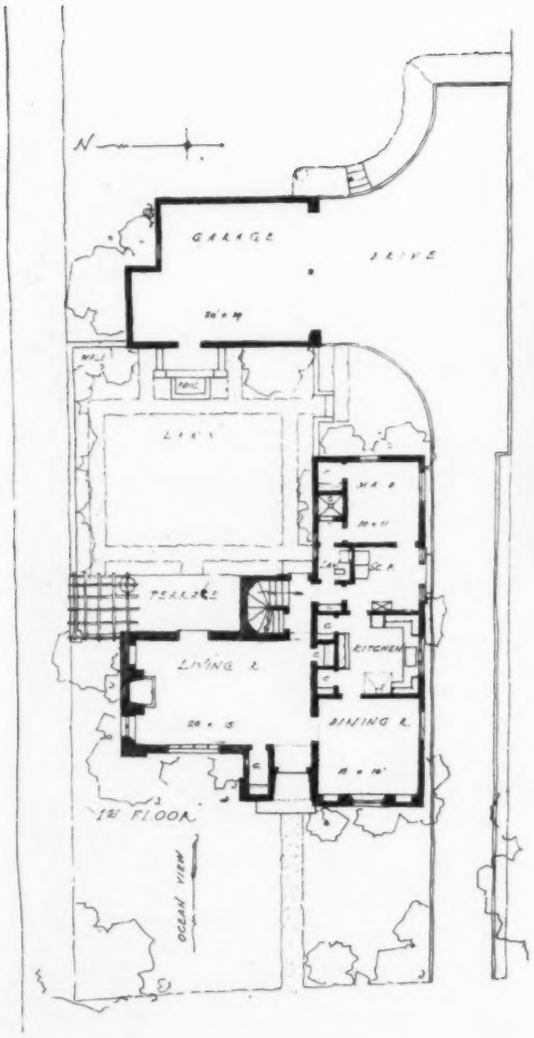
Honorable Mention — Story-and-a-half Class

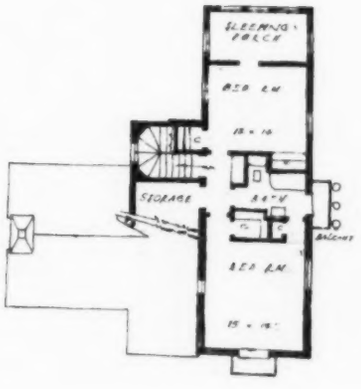
1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF E. H. CORLETT, LAKE KATONAH, NEW YORK
WALDRON FAULKNER, ARCHITECT

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF E. H. CORLETT, LAKE KATONAH, NEW YORK
WALDRON FAULKNER, ARCHITECT

Honorable Mention — Story-and-a-half Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE AT 440 VIA MEDIA, PALOS VERDES, CALIFORNIA
WINCHTON L. RISLEY, ARCHITECT



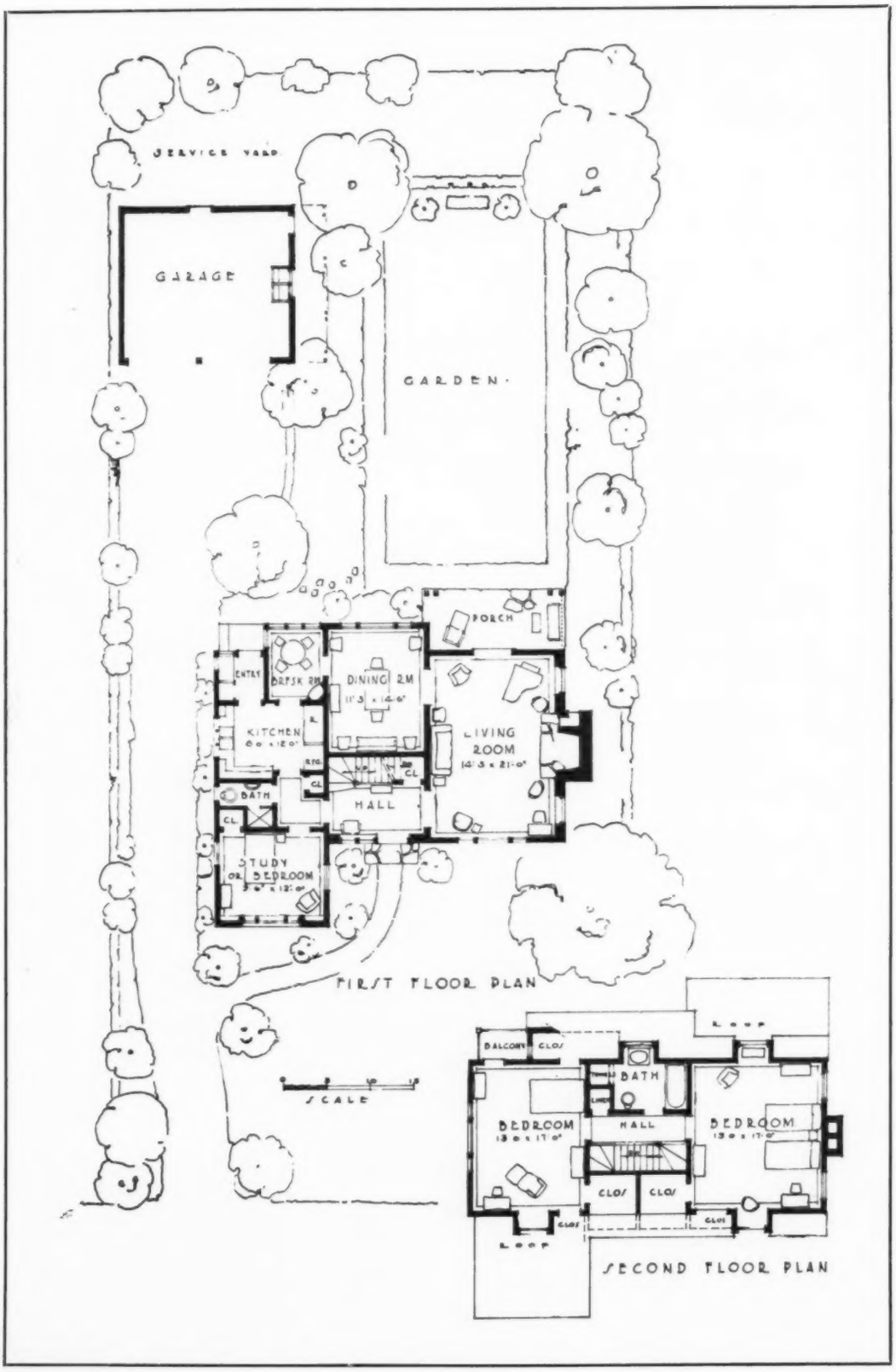


1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE AT 440 VIA MEDIA, PALOS VERDES, CALIFORNIA
WINCHTON L. RISLEY, ARCHITECT

Stoughton

Honorable Mention — Story-and-a-half Class

1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF HERBERT HICKS, SAN MARINO, CALIFORNIA
ARTHUR R. HUTCHASON, ARCHITECT



1931 BETTER HOMES IN AMERICA COMPETITION
HOUSE OF HERBERT HICKS, SAN MARINO, CALIFORNIA
ARTHUR R. HUTCHASON, ARCHITECT

THE 1931 "BETTER HOMES" SMALL HOUSE ARCHITECTURAL COMPETITION

By JAMES FORD

The great majority of small houses built in America are still ugly in design and inconveniently planned. The builders and buyers of small homes know little of architecture and fail to realize that architectural beauty and distinctiveness are qualities which are within their command. Their investment buys "just another house" rather than a home that will be convenient and livable and a community asset.

The Small House Architectural Competition conducted by Better Homes in America was undertaken to serve two purposes: first, to interest leading architects in small house design so that the standards of such design may be raised and second, to acquaint the American public with good small house architecture. It is definitely hoped and intended through these annual competitions to discover and call to public attention the very best of the small houses that have been designed and built anywhere in the United States in recent years.

Better Homes in America, organized ten years ago with the help of President Hoover, then Secretary of Commerce, is supported by philanthropic funds and established to stimulate the improvement of homes in every particular. Its 8,000 local committees annually organize contests, lecture programs, tours to improved homes and house demonstrations. Dr. Ray Lyman Wilbur, Secretary of the Interior, serves as its Chairman. William Stanley Parker of Boston is the architectural representative of the Board.

Two years ago Mrs. William Brown Meloney, Vice Chairman of the Board, offered the first gold medals for an annual architectural competition to be judged by a committee appointed by the American Institute of Architects. The competition is unusual in that the awards are made for houses actually constructed. The contest in 1930, in which Reginald Johnson of Los Angeles won the gold medal, covered houses built in the preceding year. The second competition, which closed last December, covered houses built within the preceding five years. The medals were designed by Gutzon Borglum and the presentation was made for the first contest by President Hoover at the White House in April, 1931.

This year's contest, which closed last December, was judged by a Committee consisting of Frederick L. Ackerman of New York, Chairman; William J. Sayward of Atlanta, Georgia, and Arthur B. Heaton, Irwin S. Porter and Waddy B. Wood, all of Washington, D. C.

The Report of the Committee:

"While the designs submitted came from a very wide geographical area, many states were not represented. Considering the fact that the competition was open to houses completed between the years 1926 and 1930, inclusive, and that during that period, to the knowledge of the Jury, many houses of excellent design were built, it is to be regretted that a larger number of submissions were not offered in competition.

"In the report of the Jury, covering 1930, it is stated that 'this being the first competition of the kind conducted by Better Homes in America, the Jury was mindful of an unusual responsibility in respect to this first award which would in a measure establish a precedent as to quality of designs that should be premiated.'

"In confining the award of medals to the one-story and two-story classes the Jury was of the opinion that the establishment of the medal standard in the story-and-a-half group might well be deferred.

"The Jury awards the gold medal in the two-story class to Dwight James Baum of Riverdale-on-the-Hudson, New York, for the residence of Francis Collins of Fieldston, New York. It was felt that this design represented a direct approach to the problem through simple means and the skillful handling of proportions, resulting in a house combining dignity and a homelike character. Within this same group the Jury gives honorable mention to the following:

"Winsor Soule and John F. Murphy of Santa Barbara, California, for the residence of W. E. Risser of Santa Barbara, California.

"Dwight James Baum, of Riverdale-on-the-Hudson, New York, for the residence of Thomas McCall of Fieldston, New York.

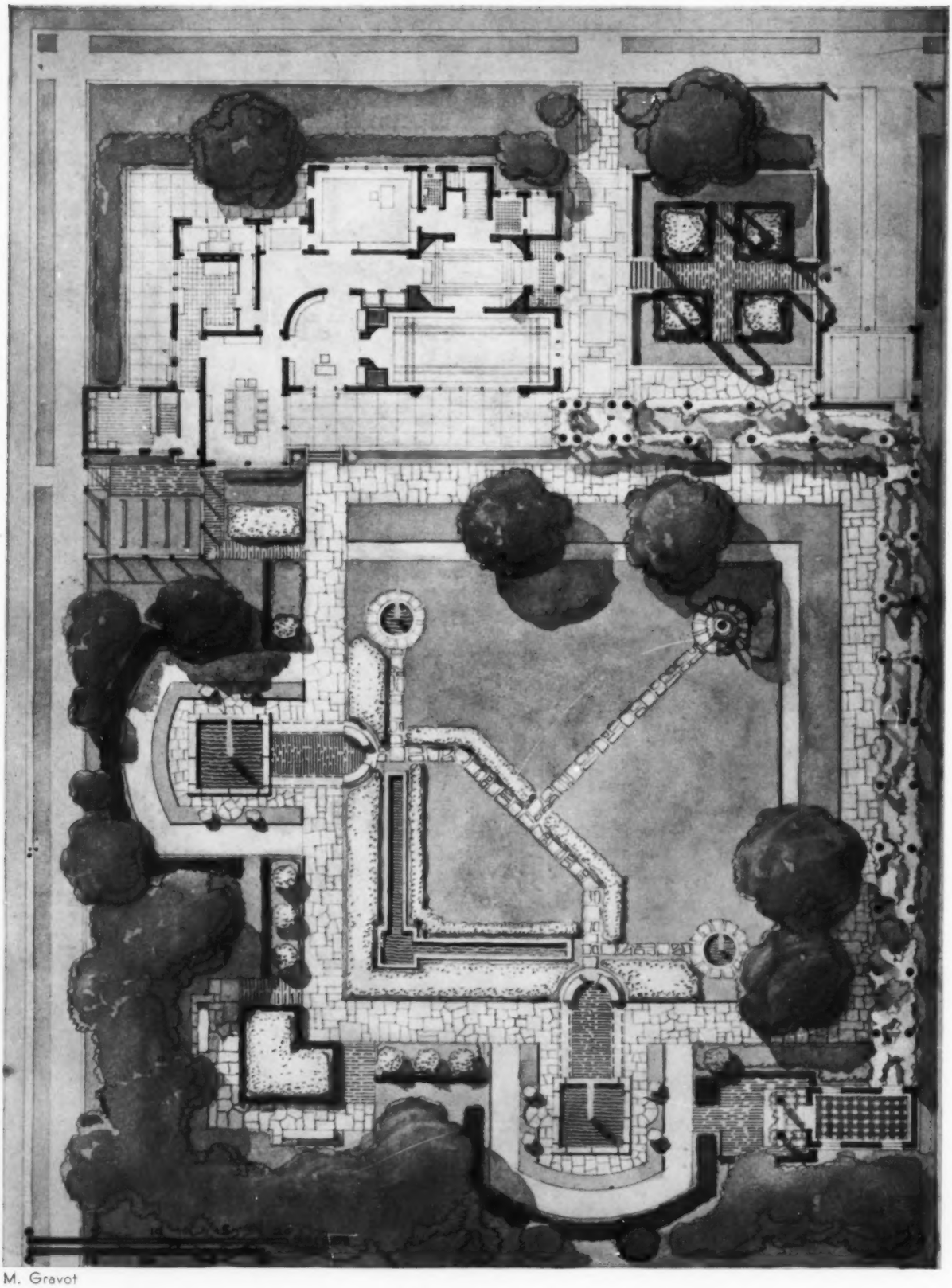
"In the one-story class the Jury awards the medal to Winchton L. Risley for the residence of Miss Stella Smith, Palos Verdes Estates, for a simple and altogether charming solution of the problem. An honorable mention is awarded to:

"Charles S. Keefe, of New York City, for the guest house at Homewood on the estate of E. Hope Norton, Darien, Connecticut.

"H. Roy Kelley, of Los Angeles, California, for residence of Gilbert Bloss, Palos Verdes Estates, California.

The Next Competition

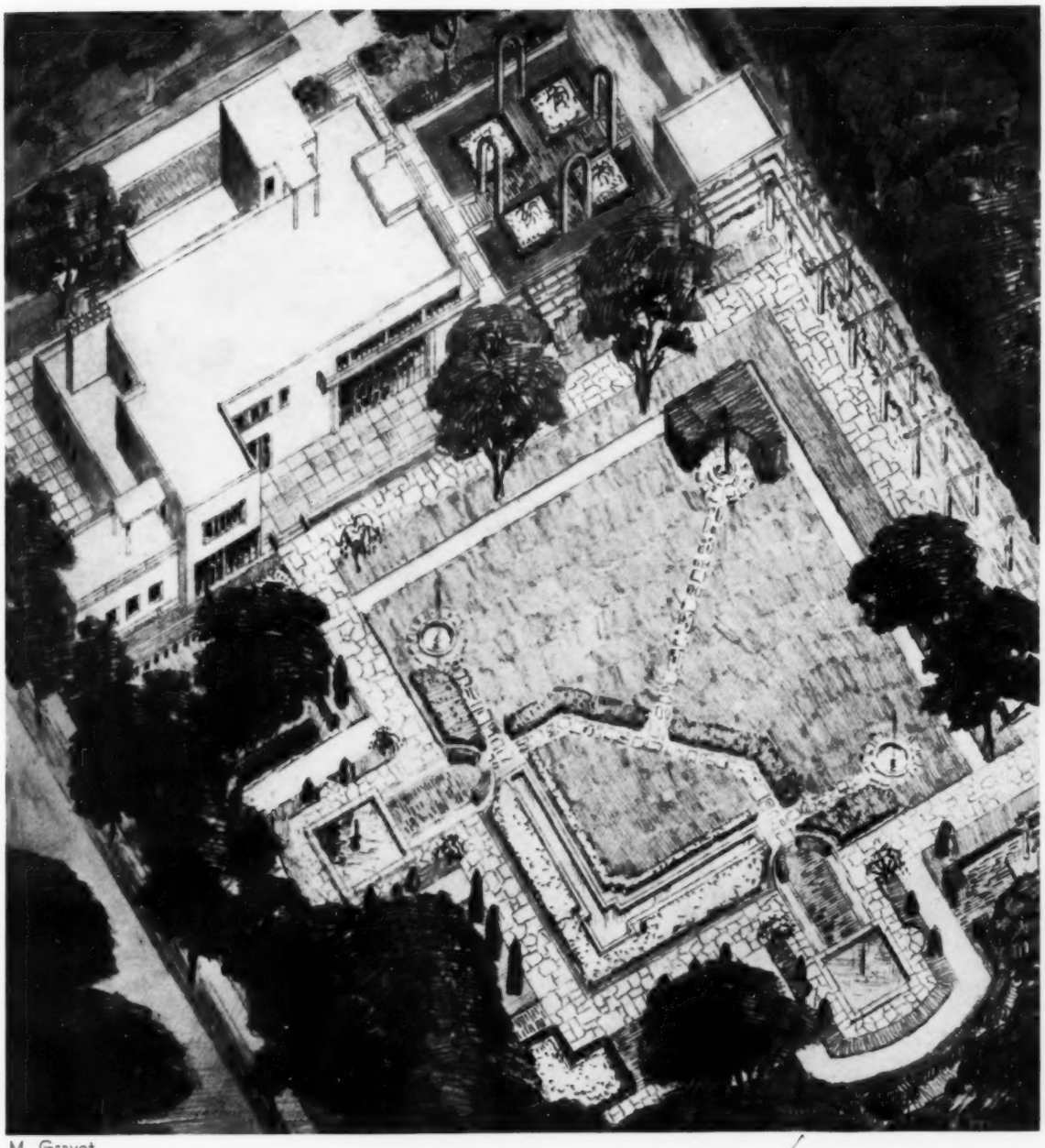
This year's competition, which will close on December 1, 1932. Plans and photographs of each house built between the years 1927 and 1931 inclusive may be submitted, provided the cubage for houses in the one-story and story-and-a-half groups does not exceed 24,000 cubic feet above the level of the first floor or 26,000 cubic feet in the case of two-story dwellings.



M. Gravot

"The treatment of modern gardens consists of extending to the surrounding grounds the principles of architectural design which govern the house."

COMPOSITION OF HOUSE AND GARDEN
DESIGNED BY J. J. HAFFNER, ARCHITECT



M. Gravot

PLAN RENDERINGS OF NEW GARDEN DESIGNS*

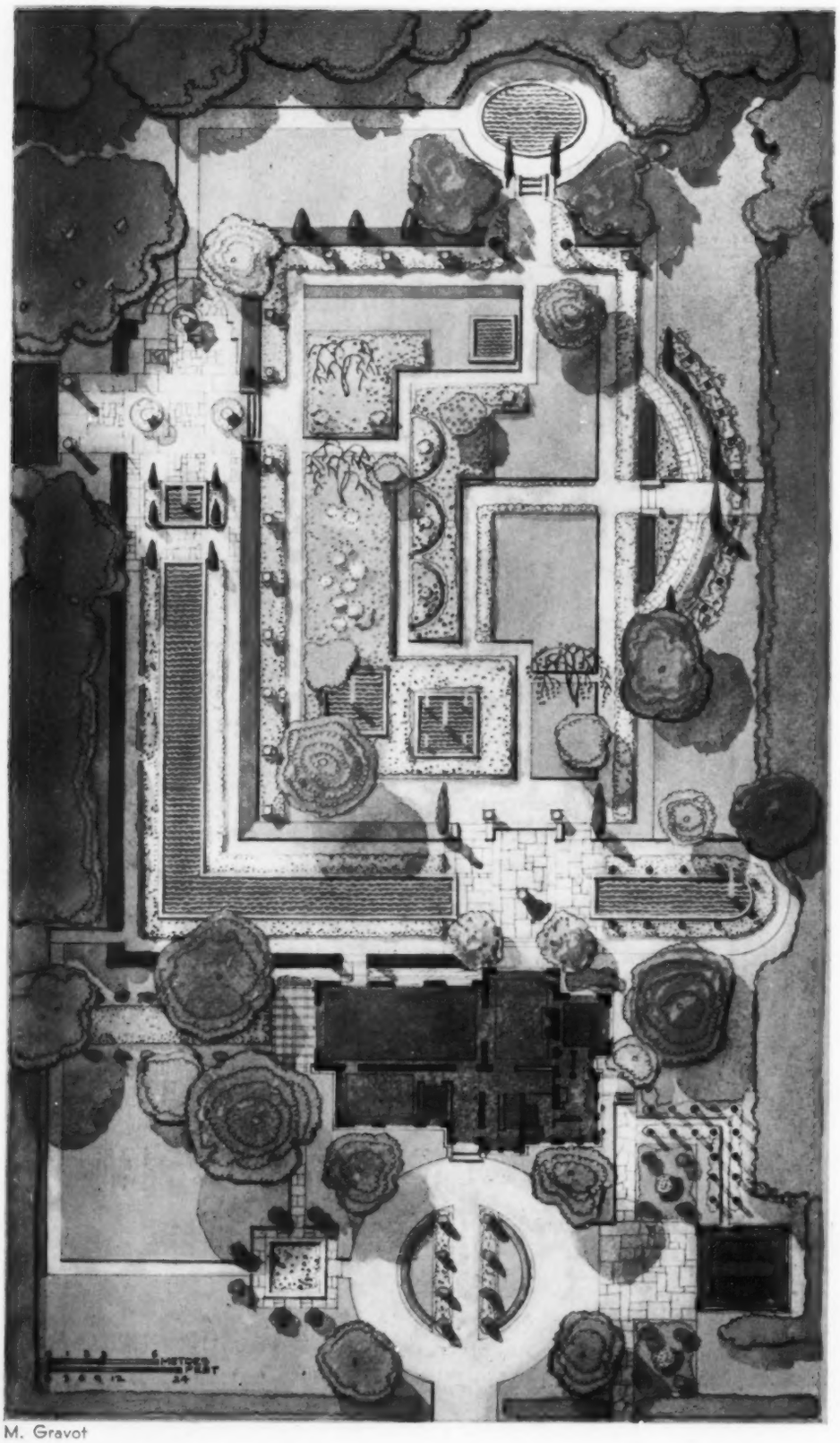
By J. J. HAFFNER, Professor of Architecture, Harvard University

Actual changes in architecture, the number and novelty of experiments made in all branches of art can leave no one indifferent. Nevertheless, order is to be found in these changes: where order is found, one may think of measure, proportions, unity, harmony.

All these qualities are the expression of tradition. Only the surface of tradition is altered entirely; harmony and unity should be obtained whatever the processes of construction, whatever the materials, whatever the dimensions or shapes of buildings. In this era we find only a different and new expression of tradition. Unfortunately we are not yet always gratified with harmony and unity in all our architectural experiments.

Whatever the future solution of the housing problem, families will have homes of some kind. Individuals will recognize the right of choosing their own designs for house or garden built according to the new aspects of tradition, but with the personal variation that free and sensitive human beings will always desire.

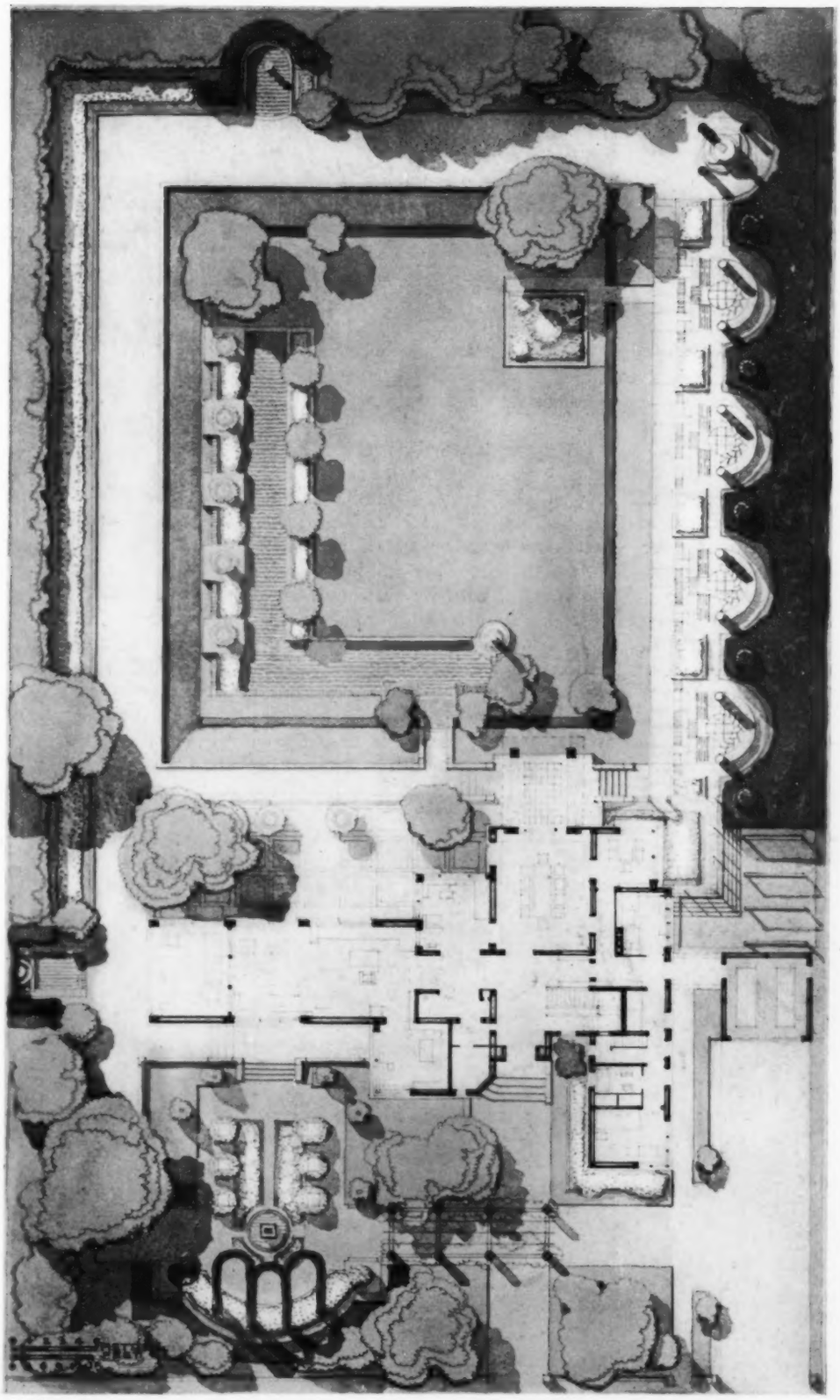
*Plans used as illustrations in this article are included in "Compositions des Jardins" by J. J. Haffner. Vincent Fréal, editors, 4 rue des Beaux Arts, Paris.



M. Gravot

"Freedom, informal balance, harmony in scale and color, good proportion of flowers, greens and paths—such is the new garden study."

SUBURBAN GARDEN DESIGN
J. J. HAFFNER, ARCHITECT



M. Gravot

"When one considers the location, the landscape, the climate, it appears that new garden designs are in infinite variety."

SUBURBAN GARDEN DESIGN

J. J. HAFFNER, ARCHITECT

Art is essentially creative. The disposition of the elements of the house is the work of imagination; so, too, should be the garden composed with it. With the hope that our leisure will increase in the future, why not think of the ideal garden as a place where we shall be able to spend restful hours?

It is pointed out definitely that the new gardens presented in this article are not supposed to surround and compose with any of the "style" houses, those reproductions of Tudor, Anglo-Norman, French eighteenth-century, Georgian or Colonial residences: gardens existing for such houses have been made and repeated over and over again, copied or inspired from those delightful old estates in England and France. To the new forms of architecture, to the use of new materials, let us apply new forms and new materials for building the modern garden.

The treatment of modern gardens should be called the architectural treatment, for it consists of extending to the surrounding grounds the principles of architectural design and composition which govern the house; the object of relating both elements is to bring about unity and harmony, to make the house integral with its surroundings.

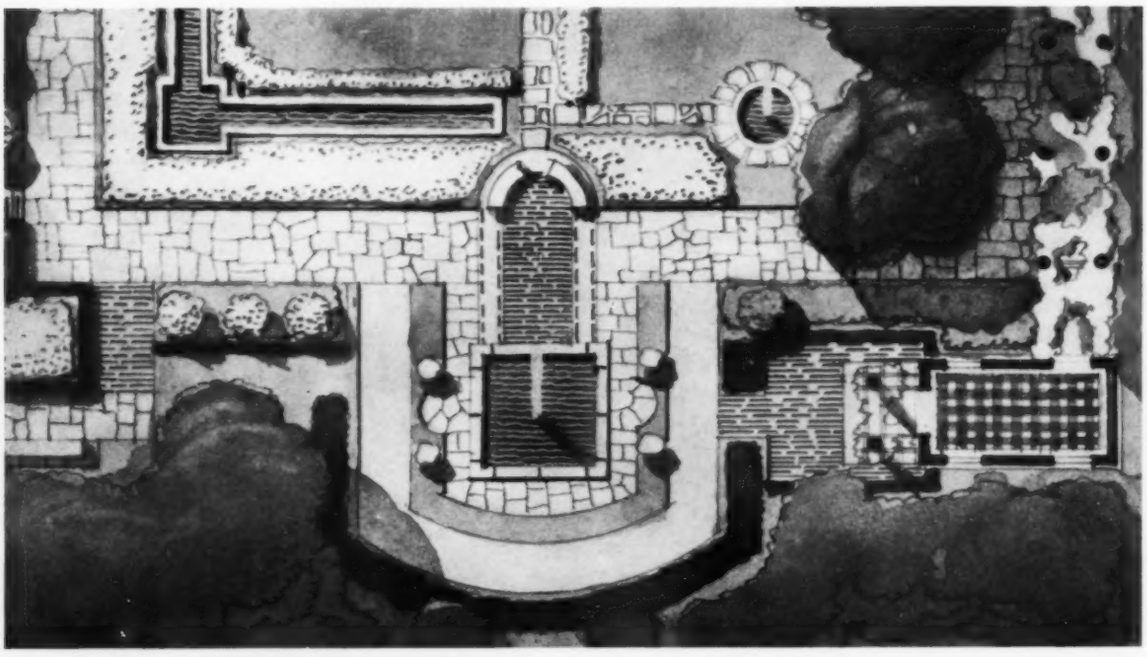
We have lost the *raison d'être* of the garden—which should be the continuation of the house in outdoor areas, and not a more or less agreeable combination of scattered features unrelated to each other and unrelated very often to the house.

The garden of the future will be the transition between the abstract volumes of the house and pure natural forms. We need this transition for two reasons. The first, which is sufficient in itself: close harmony between the two elements. Second reason: one of adaptation to social needs, developments, transformations. We entertain less in our gardens, more in clubs. We have no time to walk to distant features of the garden; we must enjoy them from the house, or from areas immediately adjacent to the house.

One other reason, a reason of observation and experience, is that the house of today cannot satisfactorily be placed on an unarranged plot of ground, with nature as the setting. A Colonial house or an Anglo-Norman cottage looks perfectly at ease in untouched nature. The modern house appears unsettled, demanding "atmosphere"; it needs accompaniment in open spaces of studied areas which will be the link between the abstract and the natural. If well studied, these areas will imperceptibly relate the house to pure nature. Great freedom in the general composition, informal balance of masses, harmony in scale and color between them, good proportion between the amount of flowers, greens and paths—such are the directives of the new garden study.

Other characteristics: greater variety of forms; more play with differences of level in the setting of flowers, the hedges, paths and water surfaces in relation to turf; greater use of contrast in masses of color for foliage, in character of plants and flowers and bushes. More opposition in setting of flowers—high, vertical, divided types of flowers contrasting with other massive, creeping, spreading types. A more comprehensive use of square-cut shrubs or hedges, of pergola or trellis work, always related in disposition and scale to the house which remains the climax.

When one considers that the location, the configuration of the ground, the character of the landscape, the climate are also elements not to be neglected, it appears that new garden designs are in infinite variety.



ENLARGED DETAIL OF PLAN, SHOWING RENDERING TECHNIQUE

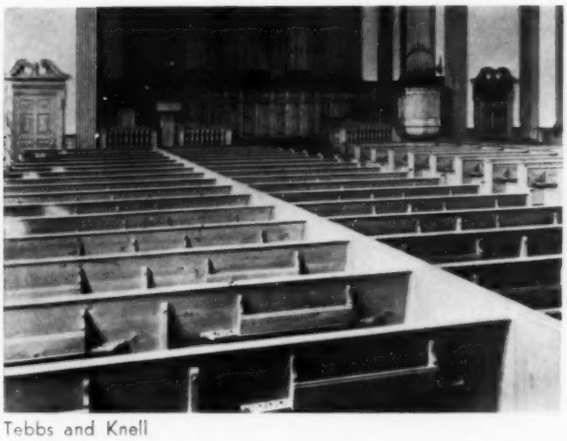
DESIGN AND DRAFTING PROBLEMS

SEATING HEIGHTS AND SPACING
TABLE SIZES AND HEIGHTS

By A. LAWRENCE KOCHER
and ALBERT FREY

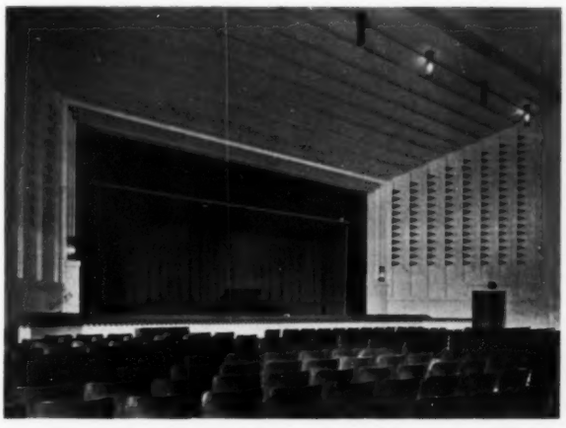
Holophane Co.

Classroom seating arrangement for general use with daylighting from left wall.

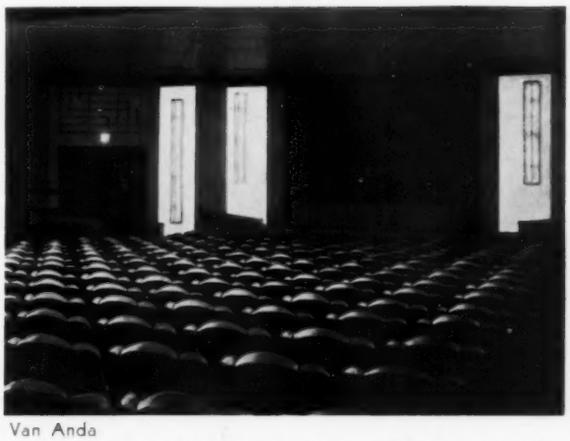


Tebbs and Knell

Bench seating in churches induces close relationship in congregational worship.



Individual seats have been adopted for the auditorium. Note relation to stage for seeing and hearing.



Van Anda

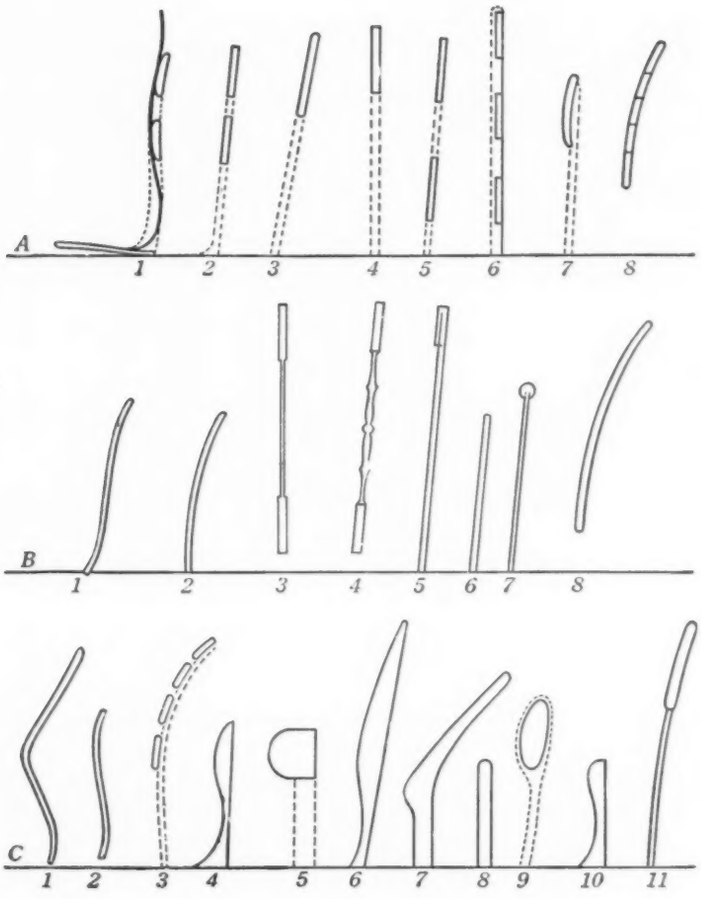
The theater to which we are attracted for pleasure demands individual seats of maximum seating comfort.

Galloway

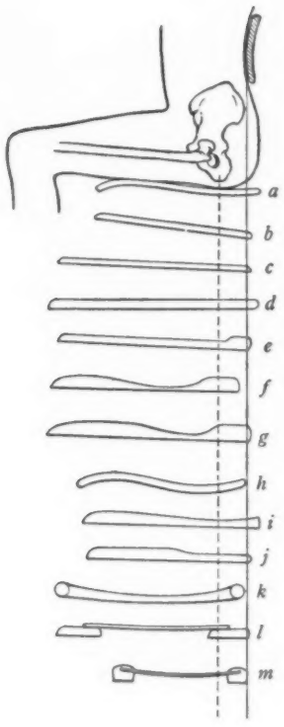
Spectators accept a more compact seating in viewing outdoor sports. Viewing a football game at Yankee Stadium, New York.

Galloway

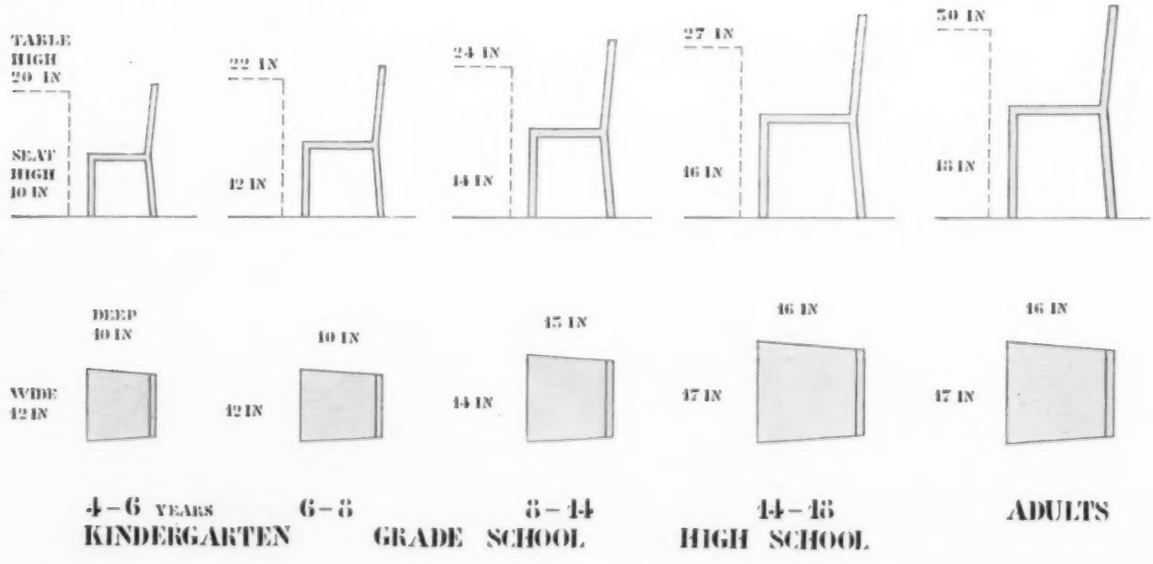
Stadium of elliptical shape determined by maximum accommodation around an oval play field. Attention is focused downward and toward oval.



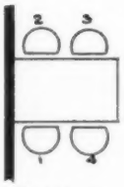
Various types of back supports used on school seats. First row: slat or cross-strip backs. Second row: vertical spindles or solid backs. Third row: various types used in European schools. All are sections along the center line. From "School Posture and Seating" by H. E. Bennett.



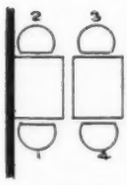
Seat forms in use on school furniture. Diagram at "a" shows relation to person seated. The seat shape that is concave toward back as shown at "a" is most desirable. There should be convex lumbar support to back of sitter.



Dimensions of available chairs of same type for different school grades and for adults. The seat height is adjusted to height of table. Tables used for reading and writing should have sloping tops.

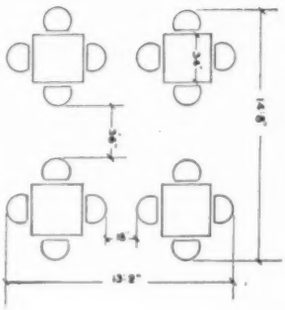


PLAN A



PLAN B

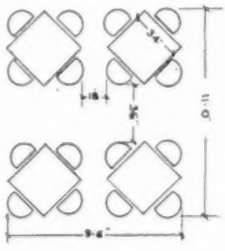
In restaurants two couples will occupy tables in plan B, while two separate parties will not occupy table in plan A unless all other seats are taken.



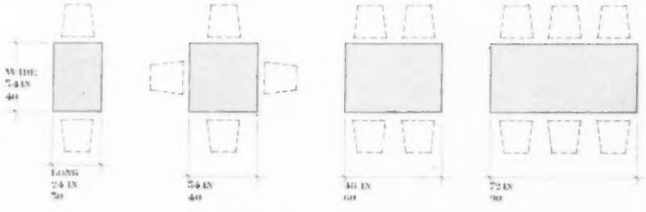
Spacing of tables in a restaurant at right angles to wall.

Troy Studio

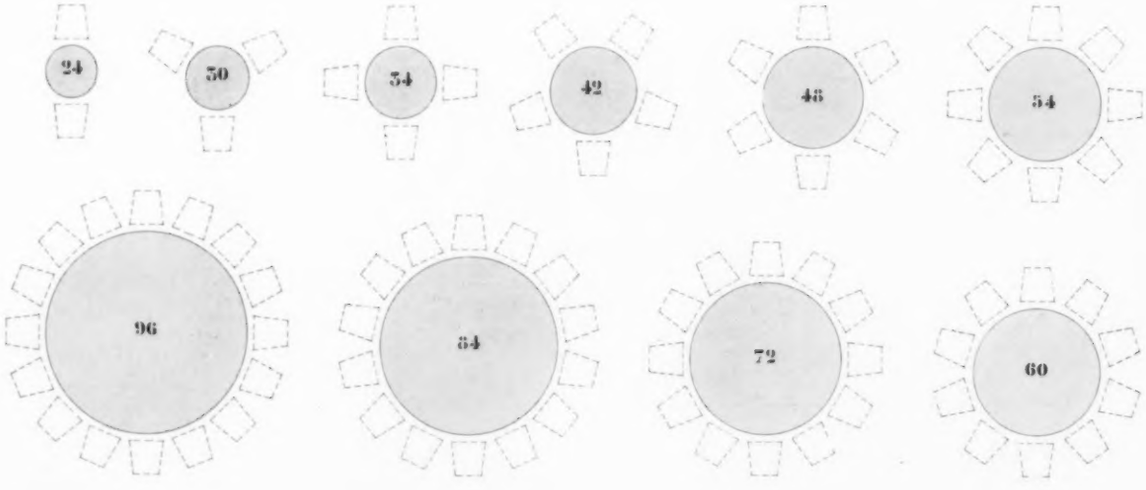
Children should have furniture suited to their size. Specialists in child welfare have discovered that children develop more favorably in a setting with furniture and surroundings proportional to their size.



Tables spaced at an angle occupy less space than when placed parallel.

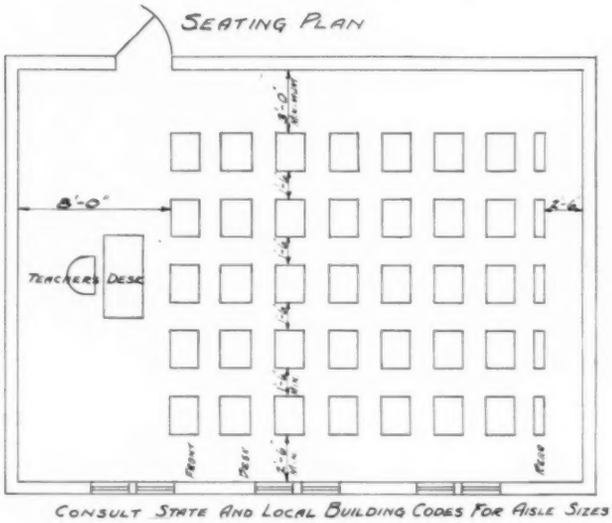


Square and rectangular dining tables of 29" height, showing required table-top area in relation to number of seats. Dimensions are indicated for minimal and comfortable accommodation.



Round table of 29" height for dining. Numbers at center of circles indicate desirable diameter in inches for tables of varying accommodation.

SCHOOL SEATING



CONSULT STATE AND LOCAL BUILDING CODES FOR AISLE SIZES

TABLE NO. 1

NUMBER OF ROWS IN A ROOM

WIDTH OF ROOM	SIZE OF DESKS Nos. 1 & 2	Nos. 3 & 4	Nos. 5	Size "A"	Size "B"	Size "C"
18 FEET	4	4	4	4	4	4
20 "	4	5	5	4	4	4
22 "	5	5	6	5	5	5
24 "	5	6	6	5	5	5
26 "	6	6	7	6	6	6
28 "	7	7	8	7	7	7
30 "	7	8	8	7	7	7
32 "	8	8	9	8	8	8
34 "	8	9	10	8	8	8

TABLE NO. 2 — NUMBER OF DESKS PER ROW

LENGTH OF ROOM	SIZE OF DESKS Nos. 1 & 2	Nos. 3 & 4	Nos. 5	Size "A"	Size "B"	Size "C"
24 FEET	5	6	6	4	4	4
26 "	6	7	7	5	5	6
28 "	7	8	8	6	6	7
30 "	8	8	9	7	7	7
32 "	8	9	10	7	8	8
34 "	9	10	11	8	8	9
36 "	10	11	12	9	9	10
38 "	11	12	13	9	10	10
40 "	11	13	14	10	10	11

TABLE NO. 1 INDICATES THE NUMBER OF ROWS OF DESKS THAT MAY BE PLACED IN ROOMS OF VARIOUS WIDTHS
TABLE NO. 2 INDICATES THE NUMBER OF DESKS THAT MAY BE PLACED IN EACH ROW IN ROOMS OF VARIOUS LENGTH

UNIVERSAL TYPE DESK
MOVABLE — ADJUSTABLE
MADE IN SIZES A-B-C

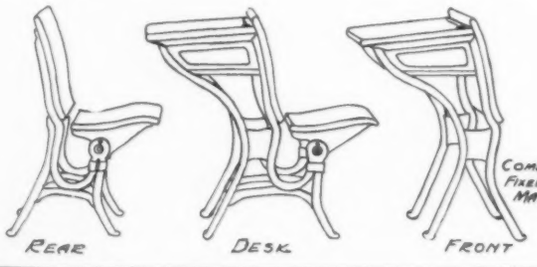
PEDESTAL TYPE DESK
FIXED TO FLOOR — ADJUSTABLE
MADE IN SIZES A-B-C

	DESK SIZE	SIZE OF TOP	HEIGHT OF TOP	HEIGHT OF SEAT	SPACING BACK TO BACK
FIXED DESKS	No. 1	16" x 23½"	30"	17 3/8"	31"
	" 2	16" x 23½"	28¼"	16 1/8"	30"
	" 3	14" x 23½"	26½"	14 7/8"	28"
	" 4	14" x 23½"	24 3/4"	13 5/8"	27"
	" 5	12" x 17½"	23"	12 3/8"	25"
ADJUSTABLE DESKS	SIZE A	17½" x 23½"	26" To 31"	14" To 18"	35"
	" B	17½" x 23½"	23" To 28"	12½" To 16½"	33¼"
	" C	17½" x 23½"	22" To 27"	11" To 14"	31½"

GRADE	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	HIGH SCHOOL
AGE	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13 UP
DESK SIZE	5	5	4	4	3	3	2	1	1
SIZE SELECTION	100%-5	90%-5 10%-4	90%-4 10%-3	60%-4 40%-3	40%-4 60%-3	30%-4 70%-3	80%-2 20%-1	60%-2 40%-1	40%-2 60%-1

	ADJUSTABLE COMBINATION DESKS								
DESK SIZE	C	C	C	B	B	B	A	A	A

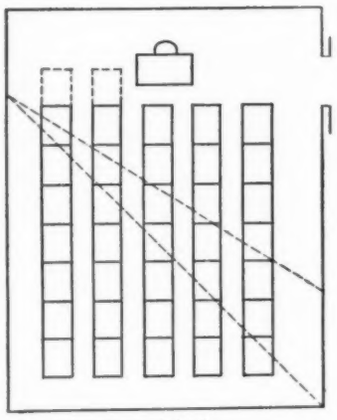
SEATING PLANS FURNISHED WITHOUT COST OR OBLIGATION BY MOST SCHOOL DESK MANUFACTURERS



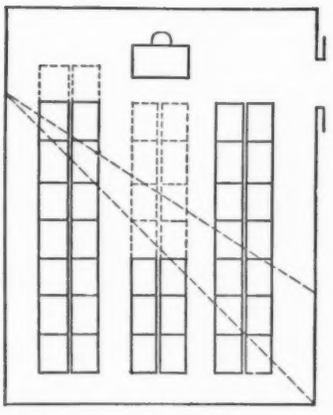
COMBINATION TYPE DESK
FIXED TO FLOOR — NON-ADJUSTABLE
MADE IN SIZES 1-2-3-4-5

ABOVE DATA FURNISHED BY COURTESY OF AMERICAN SEATING CO.

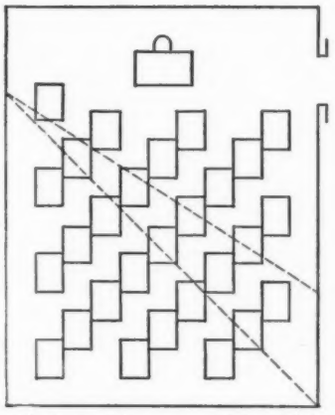
The trend in school seating is toward individual units for each pupil which will permit adjustment of seat and desk to different sizes and grades. Supporting parts are either of steel tubing or pressed steel. Parts which touch the body are of wood. The combination of a desk with a seat in front economizes material for each unit and space in the row.



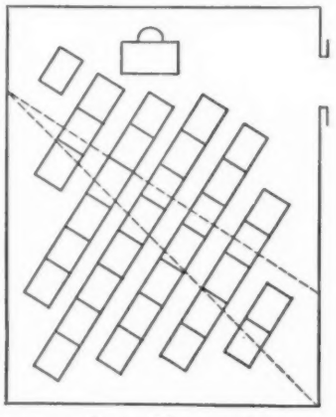
Traditional straight-line arrangement of seats. Pupils sitting behind the lower diagonal line face a serious glare and those behind the other diagonal, a slight glare.



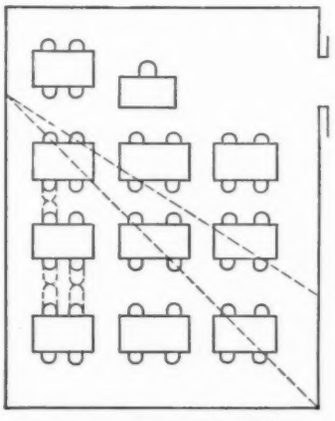
Seats arranged in double rows, making maximum seating possible but with many obvious objections. Aisles are required to do double duty. There is also too close a relation of pupils.



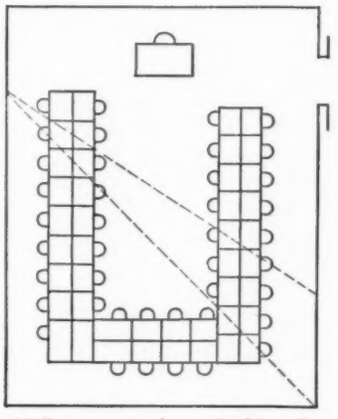
Sawtooth plan to avoid pupils' sitting close behind each other. Access from right side. Light is no better than in traditional plan. Scheme uses excess of floor area.



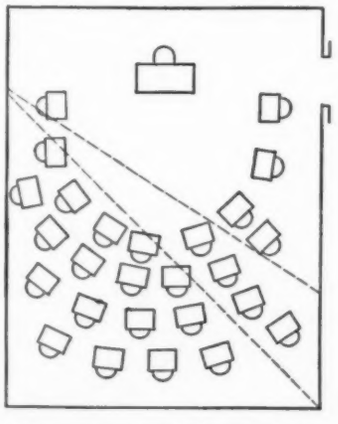
A very desirable grouping arrangement in which pupils face toward angle of classroom. Lighting from left; straight aisles and economical use of floor area.



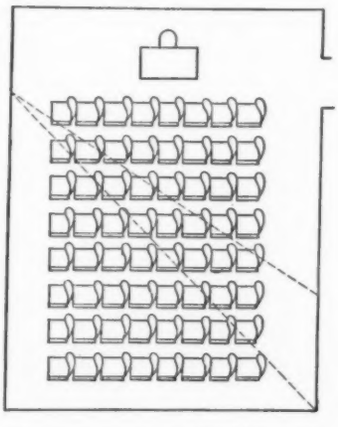
Formal arrangement of large tables with pupils facing each other. Lighting is not uniformly satisfactory. Chair movement results in confusion and waste of floor space.



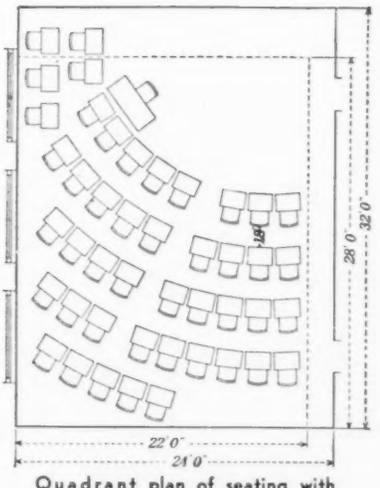
Hollow square plan, suited to primary grades "to provide open space in center and an informal socialized arrangement." Light bad for almost all pupils. This plan is extravagant of space.



Informal semicircular layout: "unitary focus," but disorderly, and facing of many pupils in relation to light is undesirable. Radiating rows of seats usually extravagant of space.



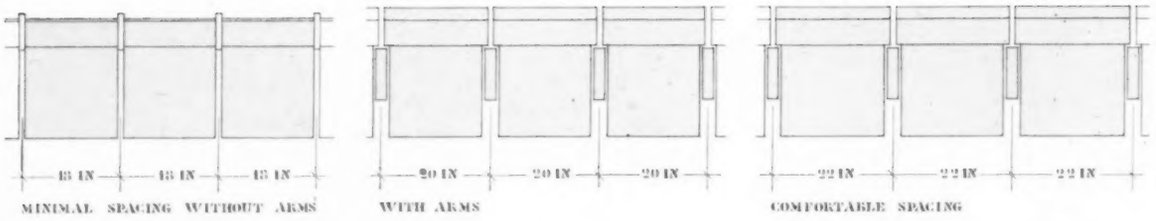
An arrangement of tablet arm chairs with maximum seating (sixty-four sittings). Suited only for lecture purposes.



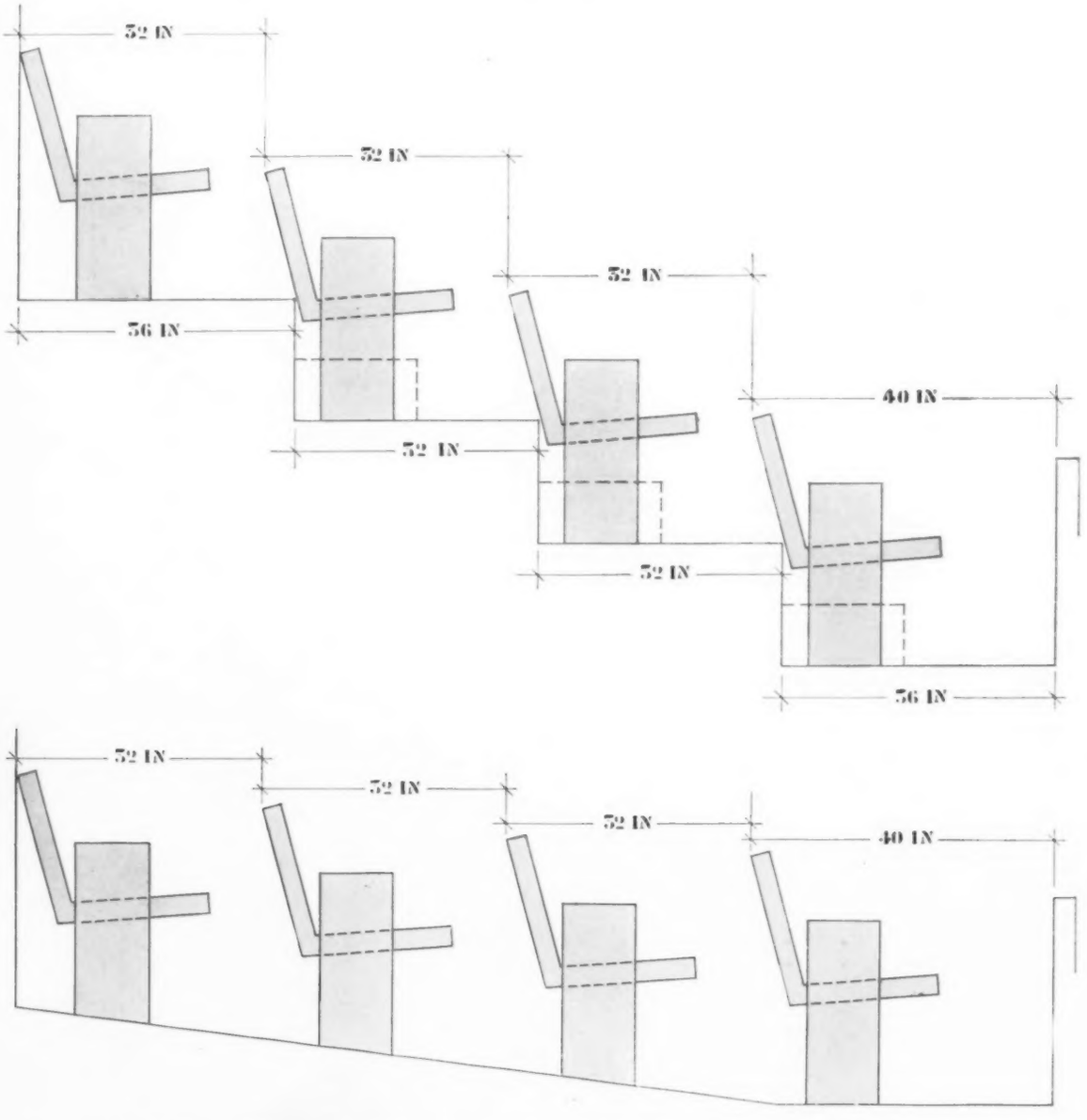
Quadrant plan of seating with excellent light for each pupil. All face toward the better lighted blackboards. A large well-shaped space for class activities.

Seating arrangements for the standard size school classroom 21′ by 28′. Aisles between desks are 18″. Aisles next to outer walls are not less than 24″. Aisles adjoining inner walls are not less than 30″ wide.

Drawings and comment on this page from "School Posture and Seating" by H. E. Bennett.



SEATS DESIGNED FOR ROWS, generally used for auditoriums, movies and other theaters. Building codes limit width of seats at 18" or 20" measured at the top of seat backs. The maximum number of seats in any row extending from one aisle to a wall is 7 (see local code). Chair-arms are usually about 9" above the seat.



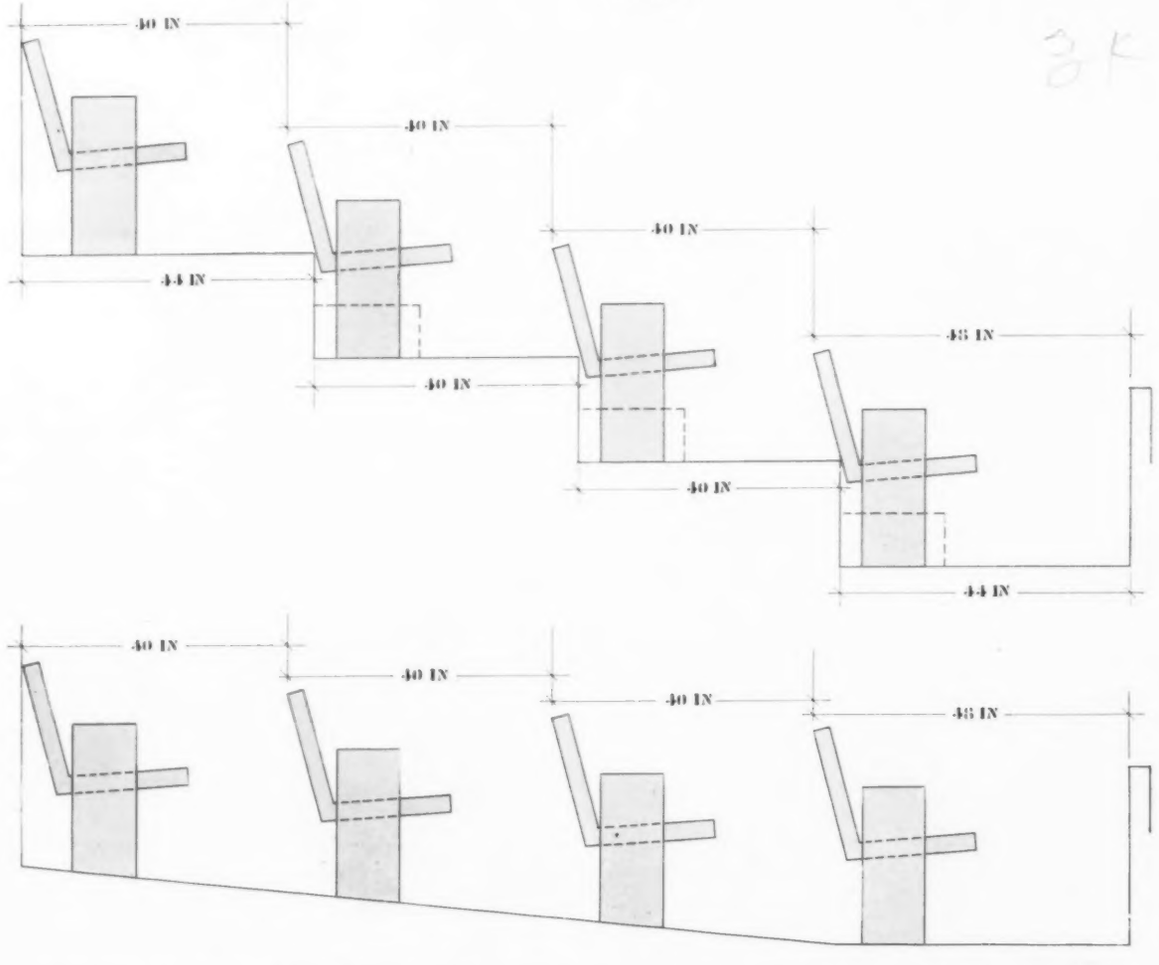
MINIMAL THEATER SEATING: section showing the minimal dimension required from back to back, and with access to the first row. Extra thick upholstery of the seat back requires additional space. On account of seat-lifting, theater and opera chairs with plywood back may be spaced as close as 31" back to back but local codes usually accept 32" as minimal.

Draftsmen in indicating theater seating on plans should make exact drawings of the audience space to an accurate scale, laying out the seating to the required back-to-back and arm-to-arm spacing. There is no accurate method for estimating the seating capacity of theatres and audience-rooms, although the following rule is frequently observed: estimate 7 to 8 square feet to each seat when on a curve and 6 to 7 square feet for straight rows. Comfortable seating, as indicated on this page, requires approximately 9 square feet per person. Allowance for aisles is included in these rules.

The minimum spacing for church pews, back-to-back, is 30 inches. Where there is ample space, placing of church seats should be 36 inches back-to-back for comfort. This permits a person to pass another without causing inconvenience. For pews and benches 18 inches is considered a "sitting."

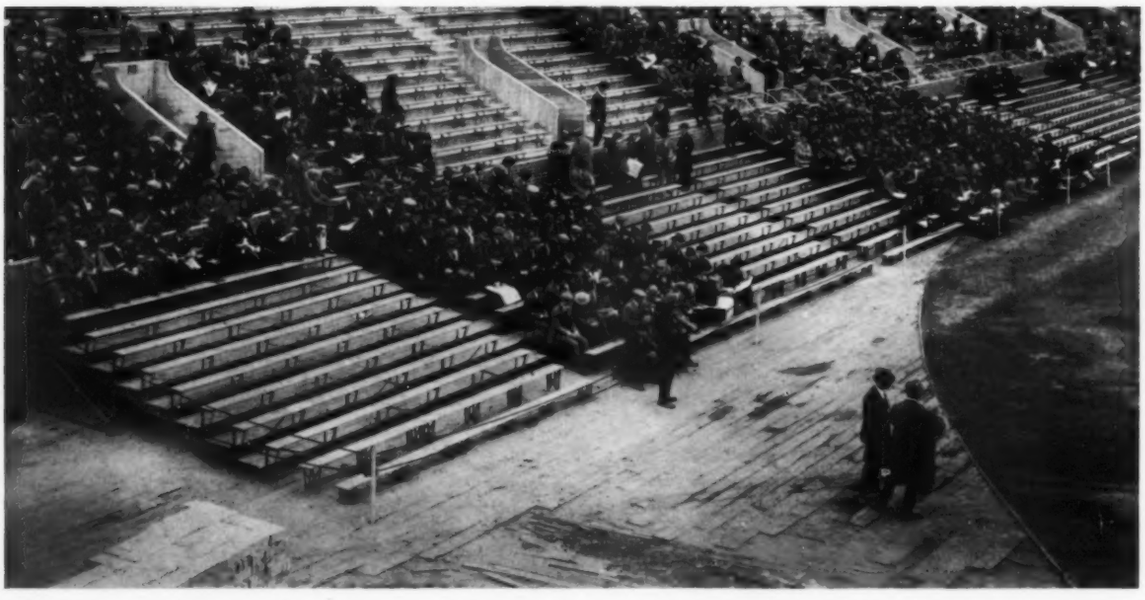
Galloway

AMPLE SPACING: this photograph shows clearly how a more ample seat spacing permits a person to enter or to leave a row without inconveniencing the persons seated. This arrangement is particularly desirable for news reel and other motion picture theaters.



THEATER SEATING COMFORTABLY SPACED: the increase in dimension from back to back requires larger floor area for a given number of seats. This would be compensated in practice by an improved average in patronage.

Dyche Stadium in shape of crescent. The backless seat is satisfactory for viewing outdoor athletic events. James Gamble Rogers, architect. Gavin Hadden, associate.

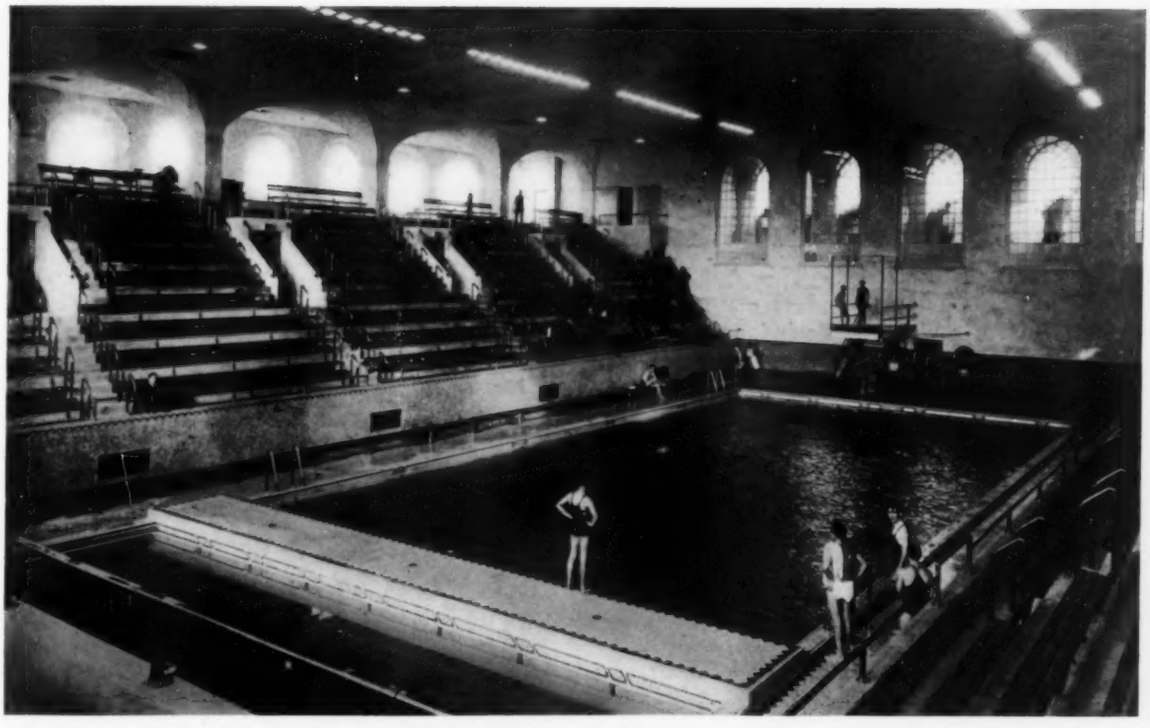


Temporary sectional steel seating in foreground, erected over running track in front of permanent seats. Franklin Field, University of Pennsylvania. Gavin Hadden, engineer.

STADIUM SEATING

Hedrich-Blessing

Chicago Indoor Stadium with individual seats facing toward square for boxing. Hall, Lawrence and Ratcliffe, architects.



Harvard Athletic Building. Steep tiers of seats necessary to see the center of all swimming lanes. Coolidge, Shepley, Bulfinch and Abbott, architects. Gavin Hadden, associate.

STADIUM SEATING

By CARL T. WASHBURN*

General Considerations

The design of a stadium structure for seating depends on (1) kind of contest or exhibition to be viewed, (2) comfort and convenience of seated spectators, (3) comfort and convenience of entering spectators, (4) probable behavior of spectators (whether they will sit back and "take it easy" or whether they will be in a constant state of restlessness and excitement as at a football game), (5) proper balancing of cost against the degree of comfort desired or deemed advisable.

In order to determine comfortable seating the following human dimensions, obtained by Dr. R. Tait McKenzie, Director of Physical Education at the University of Pennsylvania, were used:

Hip width of adult male varies from 14.3" to 11.6". Ave. 13.1".

Hip width of adult female varies from 15.1" to 10.5". Ave. 12.1".

Shoulder width of adult male varies from 18.9" to 12.6". Ave. 16.3".

Shoulder width of adult female varies from 15.1" to 13.0". Ave. 14.2".

These and other studies have shown that width for one seat (lengthwise of the row) of less than 17" is uncomfortable. The latter is generally considered a comfortable and economical minimum for football stadiums. Where space is unrestricted a width of 18" may be used, which is of course more comfortable but also more costly.

It has been found that about 15" should be allowed for the knees of spectators and for room for entering spectators.

A height of seat from the deck of 18" has been found satisfactory. This should be as high as possible because it gives more toe room to spectators in the row behind and also because with spectators sitting in a more upright position they take up less room horizontally. Higher than 18" is uncomfortable for women.

Other Considerations of Space

Designs should also consider (1) whether seats are to have back rests or not, (2) room for feet under seat, (3) room for toes under seat in front.

Seats for baseball stadiums usually have back rests because (1) nature of game is conducive to spectators sitting at ease, (2) spectators expect them and in many stadiums, such as the major league parks, have individual seats as well. Seats for modern football stadiums usually have no back rests because, unlike baseball, the spectators seldom use the backs even if they are provided. This makes for (1) decreased cost, not only because of the decreased seat material but because it allows of narrower deck tread widths, (2) less danger of injury to spectators when standing up in exciting moments, (3) lower maintenance costs.

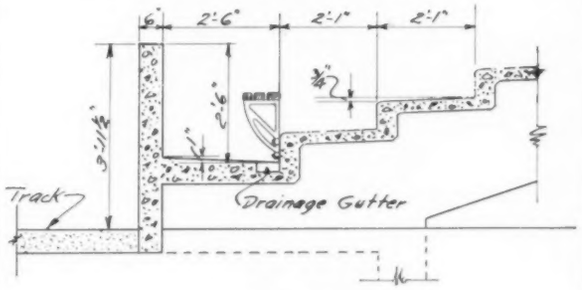


FIGURE 1

Dimensions of spacing and heights. Section of deck at front wall.

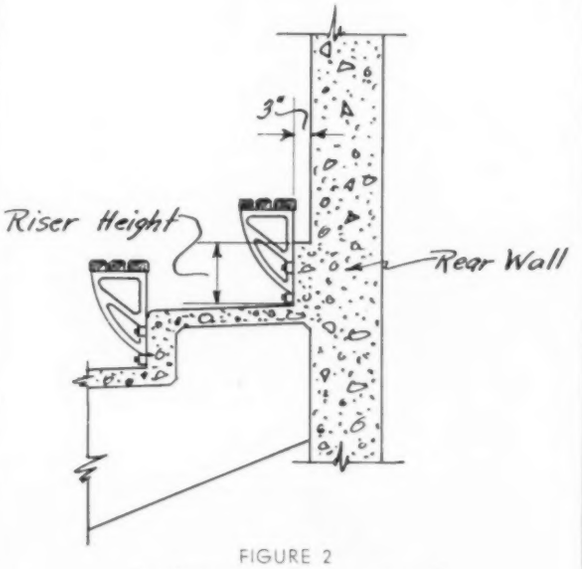


FIGURE 2

Section of deck at rear wall.

Space for knee and passage clearance at first row should be about 20" instead of the 15" mentioned above because (1) concrete front wall prevents leaning away from spectators as is possible when entering all other rows, (2) there is no additional toe room in front as in most other rows. Figure 1 illustrates a typical front section of a stadium with 25" treads, except the first tread which is 30". The height of the front wall from the first tread should be about 2' 6", as shown, for the usual football stadium, but this may depend on the sight lines from the lower rows. The heights from the track may of course vary greatly.

No extra space is allowed beside an end seat which is against a wall, but 3" is allowed back of the last row of seats. Figure 2 illustrates this.

As a guide to the total area required for a stadium, given the number of seats desired, we may use the following for a stadium with 25"

*Information and drawings in this article were obtained from the office of Gavin Hadden, Civil Engineer, 607 Fifth Avenue, New York City, designer of numerous structures and playfields for athletic purposes.

treads, 3′ 0″ aisles and portals about 43′ center to center:

(a) Up to 20 rows, 3.4 sq. ft. per seat.
(b) Up to 40 rows, 3.3 sq. ft. per seat.
(c) Other treads in proportion.

General Arrangement

Sections between aisles may be from 24 to 32 seats wide; 26 or 28 are favored because (1) they are even numbers, (2) 28 is also divisible by 4 in case seats are ordered by groups of 4 instead of 2, (3) they are a good compromise between efficient movement of traffic and maximum seats per area, (4) in the framing of concrete members of the deck they lend themselves to efficient lengths and sizes of girders and beams.

End sections (with wall at one side) may be from 12 to 16 seats wide and should contain an even number of seats. This is permitted in stadiums but usually limited to about 7 by the building laws for indoor auditoriums.

Any other unusual division of seating areas, such as between portals, should be arranged if possible with an even number of seats.

The above principles will be made clearer by a study of the seating chart as explained below.

Numbering of Seats

For a stadium of 50 rows or less the accepted method of designating seating is: section (or portal) by number; row by single letter up to 25 and double letter up to 50, omitting "I" because it looks like "one": seat by number.

Sections should include the aisle and on both sides halfway to the adjacent aisles.

Seats should be numbered odd on one side of the aisle and even on the other to facilitate traffic handling.

Where portals make fewer seats per row the numbers should be in line with all other numbers, and therefore do not begin with 1 and 2, but (since a portal usually cuts out two seats on each side) with 5 and 6.

Figure 3 illustrates part of a typical seating chart. It will be noticed that the seat numbers at the end of the stadium are "28," while at the intermediate sections the number is "26." This is because we have 26 seats between aisles in the intermediate sections, half of which would be 13, but we want an even number at the end section, hence we use 14 and the seats are therefore numbered "2" to "28," using only even numbers.

One of the most satisfactory and permanent methods of marking the seats and rows is by means of Monel metal markers with embossed numbers and letters. These are fastened to the wood seat slats with brass, nickel-plated, barbed escutcheon pins (barbed in order that they may not easily become loose or be pried loose with a knife blade).

Stadiums with more than 50 rows or with more than one portal per aisle usually offer particular

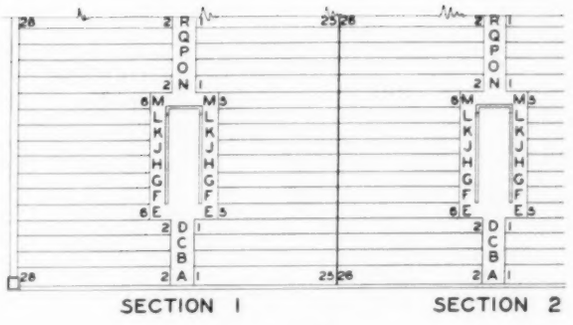


FIGURE 3
Part of typical seating chart.

problems and no particular way of designating seating can be given, but the general method as outlined above can usually be applied. Some changes will be necessary, such as numbers to designate rows (since triple letters are unwieldy).

Details of Construction

Figure 4 illustrates a typical *seat* and bracket without back rest. This seat, which has given good results, is of 3 strips of wood, continuous except at expansion joints, where a space of 1″ is left. Lumber should be edge grain Gulf Cypress or Redwood. This lumber will give satisfactory results even when untreated. This seat has been found to be quite comfortable and is believed to have the following advantages over a solid seat: (1) deteriorates more slowly, (2) more springy, (3) easier to replace if broken, (4) dries out more quickly after rain, (5) less liable to warp.

The *bracket* illustrated in Figure 4 was developed in Mr. Hadden's office and has proved eminently satisfactory. Dimensions are shown. Material is gray cast iron, with all parts hot galvanized. These brackets should be spaced between 4′ 6″ and 5′ 0″ on center. It will be seen at once that the bracket in Figure 4 cannot be used on risers of less than 9″ in height. For lower risers a similar bracket is used with 3 anchor bolts (2 upper and 1 lower) placed closer together.

This form of seat and bracket has the following facts to recommend it:

(1) It allows spectators to put their toes under the seat in front when the riser height is not more than 14″ or 14½″.

(2) It allows spectators ample foot room beneath the seat itself. This also means that there is more room to change the position of the feet, which is especially appreciated by long-legged men. This is a decided advantage over seats placed directly on the concrete both because of the greater comfort and because—

(3) It permits a tread width of 25″. Since the cost of construction per seat of a stadium varies very nearly in direct proportion to the tread width, the use of a 25″ tread instead of, say, a 30″ tread means a saving of 17% in the cost of the structure.

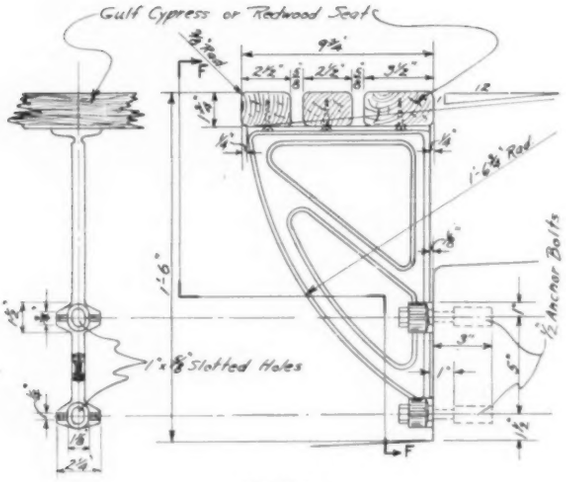


FIGURE 4

Working detail of backless stadium seat, similar to seats of Dyche Stadium, page 268.

(4) The bracket is in itself economical since there is a minimum of metal in it.

(5) It permits easy and thorough cleaning of the deck.

Figure 5 shows a seat and bracket with back rest. Except for the back rest it is very similar in materials and construction to that in Figure 4. All the arguments and discussion also apply except that a minimum tread width of 30″ is required. This seat is, of course, more comfortable for the seated spectators than the seats without back rests, but there is no difference to entering spectators between a 25″ tread without back rest and a 30″ tread with back rest. As we noticed in Figure 4 this particular bracket can be used only for certain riser heights, but by changing the 9″ dimension between the anchor bolts and by making other corresponding variations in the design, it can easily be accommodated to almost any riser height. The photograph on page 268 is of the Dyche Stadium at Northwestern University, designed by Mr. Hadden in association with James Gamble Rogers, Architect. The photograph on page 269 is of the Harvard University swimming pools for which Mr. Hadden was the consulting engineer.

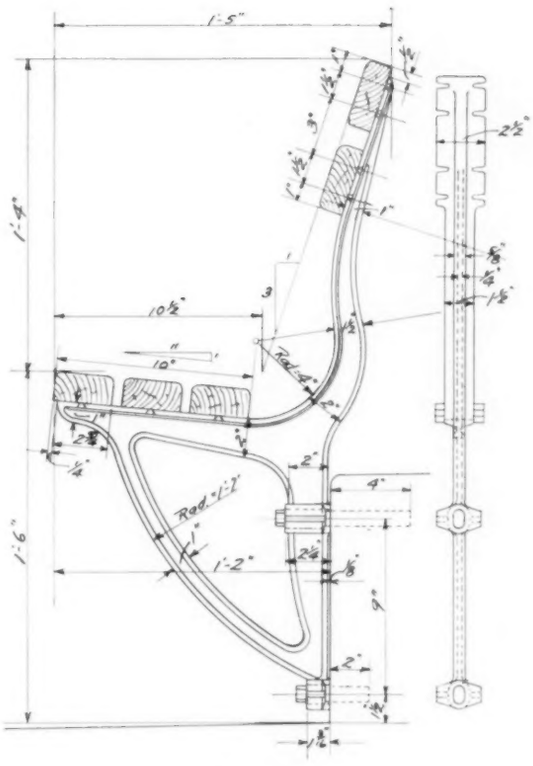


FIGURE 5

Working detail of seat with back rest, used at Harvard Athletic Building, see page 269.

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Davison, R. L. *Procedure in Designing a Theater.* The Architectural Record, May 1930, p. 457.

SCHOOL SEATING*

A Study of School Posture and Seating. Elementary School Journal, pp. 50-57, September 1925.

A valuable summary of the result of studies of school seats and seating as conducted with facilities provided by the Experimental Schools of the University of Chicago and a leading industrial organization engaged in the manufacture of school seats.

Adopt Standards for Folding and Portable Chairs. American School Board Journal, p. 72, April, 1928.

Distributors of folding and portable wood chairs in cooperation with the Bureau of Standards of the U. S. Department of Commerce set definite standards.

Anderson, C. A. *The Problem of Classroom Seating.* American School Board Journal, pp. 87-89, 126, January 1925.

Proposes some general principles to be observed in school seating. Evaluation is made of various seating arrangements.

Bennett, H. E. *School Posture and Seating.* American School and University, 1928-1929, pp. 226-229.

*Comment by John W. Sahlstrom, Department of Educational Administration, Columbia University.

CORRESPONDENCE FROM ARCHITECTS

IS THE EQUITY TRUST A PRACTICAL MEANS OF SLUM CLEARANCE?

To the Editor:

In any article by Arthur C. Holden one expects to find much that is provocative and much that is practical as well. "Facing Realities in Slum Clearance," in your February issue, contains both of these ingredients in generous measure; but I wonder if some different or added ingredients may not be essential before a wholesome pudding can replace our present housing stew.

If you will ask Mr. Holden to answer through your columns the questions which follow, you and he may aid in clarifying one of the most important and difficult of our present-day problems.

(1) In introducing his Equity Trust idea, Mr. Holden suggests that "if individual owners can be *made to* act together in such a way that individual rights will not be injured and at the same time the public interest will be better served, then the state can afford to grant owners, who *agree to* cooperate in such a way, special rights for development and a special franchise under which to act."

The italics are mine; they emphasize what I fear would prove to be an impracticable combination of compulsory and voluntary action. Assuming that most of the property owners in a slum block or blighted district would gladly unite in an Equity Trust for the reconstruction of the area, how would Mr. Holden handle property owned by incompetents, minors, scattered heirs of old estates, or others unable or unwilling to join voluntarily in the project? If by law the majority were given the right to compel the minority to join in the scheme, is it likely that such action would be held legal by the courts unless the property were purchased for cash? And in that event where would the cash come from and how would excessive awards be prevented?

(2) As Mr. Holden well points out, "no pooling of equities could be accomplished without consideration of the very large mortgage interests involved. . . . Savings, trust and life insurance institutions cannot afford either to take or to permit any action to be taken which would jeopardize their trust funds. Therefore, such action as is taken must be with their approval and must serve their advantage."

Here is another tough ingredient. Would it not become quite indigestible if the same right of veto were given—as I assume would be legally necessary—to all individual holders of mortgages on the property to be assembled?

(3) "New capital must, of course, be attracted if a really comprehensive rehabilitation is to be undertaken," says Mr. Holden; and he suggests that such capital "may be obtained by borrowing if the economic situation warrants, or it may be admitted to a direct share of the Trust." Has consideration been given to the fact that borrowing, if resorted to, would have to be by securities subordinate to the pooled first and second mortgages previously existing; and that if construction were financed by the sale of shares in the Equity Trust, the earning power of the new capital would be diluted considerably by the inflated values without which most of the property owners in the district could never be tempted into the Trust. Mr. Holden states that "the participant owners are all alike interested in keeping both capital values and annual charges due to capital as low as possible." Would it not be more accurate to say that the owners *all together* have such an interest; but that as individuals they are *all alike* interested, when exchanging property for Trust shares, to make their own capital values and annual charges as *high* as possible?

I hope Mr. Holden has convincing answers for all of the foregoing questions. If not, maybe he will some day join the slowly growing ranks of those who see no other practical pathway out of the slums than that blazed by Henry George half a century ago.

HAROLD S. BUTTENHEIM,
Editor, *The American City*

A REPLY BY ARTHUR C. HOLDEN, ARCHITECT

To the Editor:

Mr. Buttenheim's letter is both pertinent and helpful. Before proceeding to the detailed consideration which it deserves, it is well to note that all three of Mr. Buttenheim's specific questions are closely related to that one paramount question which has puzzled man since ancient times. That question is: "Why is it, that, although man is a reasonable creature, he constantly neglects to make use of his reason to plan the course of action he is to follow; but only makes use of his reason afterwards to rationalize the predicament he has got himself into by allowing his emotions to control his actions?"

Immediate self-interest is recognized today as the dominating motive force in what we are pleased to call "our civilization." Those who have

read history with understanding know that it has been self-interest which has obscured man's vision and made him refuse to think.

But to admit that man has acted so frequently as a shortsighted greedy creature, is not to admit that his case is hopeless. In times of adversity and under a common danger men act together as instinctively as in the ordinary course of untrammeled life they act as selfish individuals.

These *are* times of adversity. We are seeing the extraordinarily delicate and complicated forces of production which we have built up for the service of one another, threatened with dissolution because we are unable to offer a reward for individual service which will maintain individual men in the standards of life we believe to be desirable. Production according to past standards has become unprofitable. To make up the deficiency we are living upon and consuming accumulated capital. We do this because capital has lost a large part of the values which it had as a productive force. Capital values are being dissipated. Capital values in land and real estate are no exception to the general decline, because real estate is dependent for its earning power upon the total productive ability of society.

Here is the root of the difficulty which is faced by real estate and by its servant, the building industry. As architects, bereft of an outlet for the activities for which we are trained, we are today deeply concerned with fundamentals. Hence it behooves us to throw our energy and intelligence into the balance and to attempt to awaken our bewildered brothers to a realization of the common danger which confronts us.

Herein lies the direct answer to the first of Mr. Buttenheim's questions. He asks how are we to handle those unable or unwilling to join voluntarily in the project. Let me make clear that I dealt with "blighted areas" because their case being nearer "hopeless" they are that much nearer to a realization of the peril which confronts them, and, therefore, more apt instinctively to act for their common safety. Mr. Buttenheim used the word "unable" advisedly. Present legal restrictions alone justify the use of the word "unable." The aid of the law not only "may" but "should" be invoked to protect the interests of incompetents, minors, scattered heirs of old estates, etc. Permissive legislation would place in the hands of such owners trust certificates in negotiable form which would retain for them the usufruct of the property and place its administration in the hands of competent trustees. There is no new principle involved here. What is recommended is a modernization of processes which are antiquated.

The state may by law determine the criteria whereby "blighted areas" may be recognized as a burden to the state and the owners of such properties for that reason given forms of paper as evidence of their ownership different from those which are held by owners of economically productive properties. In the final analysis a piece of paper called a deed, against which the legal practice of centuries has built up certain encumbrances, should be no greater comfort to an owner than a piece of paper known as an equity trust certificate against which the encumbrances have been redefined by new legislation.

Herein lies the answer to Mr. Buttenheim's second question. The special franchise granted by the legislature for the incorporation of an equity trust for a blighted area would set down the method for dealing fairly with the present owners of mortgages. It is my own opinion that it should be made legal for mortgage institutions to accept the scientific valuation set upon properties within blighted areas. In view of the conditions existing in these areas, it is in the public interest that acceptance should be made mandatory. Such legislation involves only a single step in advance of legislation already enacted. In cases of bankruptcy legislation has set down proceedings to be followed for the abrogation and equitable adjustment of contracts which are impossible of execution. The proposed step, in cases where bankruptcy is recognized as inevitable, sets up an equitable method of relief applied in advance in the hope of restoring economic balance without resort to bankruptcy.

Permissive legislation should be passed giving reasonable discretion to mortgage institutions to accept various combinations of types of securities in exchange for their present mortgages. This permission should take into consideration possible reductions in the rate of interest, possible necessary writing down of capital values, and possible conversion of mortgages into equity trust shares. The petition of a reasonable proportion of mortgage holders in addition to a reasonable proportion of equity owners should be a prerequisite to the organization and chartering of an equity trust. Such a petition having been entered, the trust should be formed subject only to the findings of the committee on scientific valuation.

As to Mr. Buttenheim's third question which involves the relation of new capital to present interests as vested in both equities and mortgages —it should be sufficiently evident from what has already been said that the proposal does not contemplate the taking over of either equities or mortgages at prices listed on the books of present owners. What is contemplated was suggested merely in outline in THE ARCHITECTURAL RECORD for February. It involves the determination of a ratio of values between individual parcels and the whole property. Equity shares will be expressed not directly in money values, but in fractional values of the whole. Briefly, this means that the district will be administered as an economic unit and the income received will belong to the participating equity owners in direct proportion to the fraction represented by the shares held.

There is perfectly good precedent in receiver-

ship procedure for a general reorganization with the rearrangement of security issues. It should be made clear that the proposed equity trust procedure is not a parallel to foreclosure proceedings and that it does not contemplate "wiping out any interest." It proposes a revaluation and a reassignment of the shares justly due as a result of changed values to the several parties concerned. The effort should be made to write fixed charges down to a minimum. Any mortgage bond issue should, therefore, be made as small as possible and the effort made to induce present mortgage holders to receive a part of their interest in equity shares, but it is clear that such a substitution cannot be compelled.

It must be recognized on the other hand, that it will be an exceedingly delicate matter to place a price upon equity shares at which they can be sold to the investors of new capital. Any effort to sell equity trust shares as a bonanza would be fatal to success. I should recommend that equity shares should not be salable directly to the public but only exchangeable for mortgage certificates; all exchanges to be made in such amounts and on such terms as set by the trustees. A nice balance must be maintained between fixed and variable charges. The financial structure of the equity trust should be carefully worked out, and provision made for reasonable variations of obligations in good and bad times.

I have no illusions as to the difficulties which must be overcome before a completely rounded equity trust can be put into operation. Many of the principles should be tried out separately.

It must be remembered above all things that while administrative direction and control is sought, the purpose of this control is not to destroy individual initiative but to direct and protect it. It aims in the first place to supply the users of real property with a correct understanding of the economic principles involved and to put into their hands tools to make this knowledge effective. In the second place it aims to prevent the exploitation and spoliation of property. In the third place, it offers a way out of some of the perplexities which beset our local governments.

The closing sentence of Mr. Buttenheim's letter invites special comment upon this latter phase of the subject. The fiscal policies of our municipalities have apparently followed the desires of those most influential in real estate. Possibly it is largely for this reason that our municipalities have over-obligated themselves for expansion into new districts. Under the equity trust system where emphasis is put upon the administration of properties for earning power instead of upon sale and turnover, the relation between taxation and economic rent will tend to become more apparent. It would not be unreasonable to grant to districts administered by trustees the right to apportion taxes on the basis of the rental equivalent. I favor such a step because it would be an additional step in the progress back to economic sanity in real estate administration.

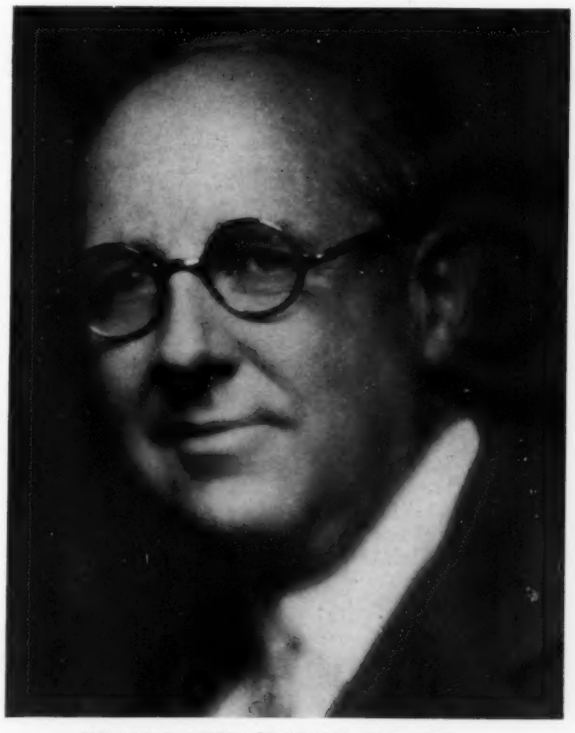
ARTHUR C. HOLDEN, Architect.

WILLIAM AIKEN STARRETT

Word is received of the death of Colonel William Aiken Starrett, President of the Starrett Construction Corporation of New York City, on March 25 at his home in Madison, New Jersey. He was associated with the construction of the Empire State Building, 40 Wall Street Building, the Starrett-Lehigh Industrial Building and numerous other structures.

After leaving the University of Michigan, Colonel Starrett was with the George A. Fuller Co., and later, with the Thompson-Starrett Co., builders, until 1913 when he left this firm to join his brother Goldwin and others in forming the architectural firm of Starrett and Van Vleck. During the War he was Chairman of the Construction Committee of the War Industries Board. In 1922 he joined Paul Starrett and Andrew J. Eken in forming Starrett Brothers, Inc., now known as Starrett Brothers and Eken, Inc.

In addition to his building activities Colonel Starrett was well known for his accomplishments as a writer and speaker. He was the author of a book, "Skyscrapers," published by Scribner's, and a series of articles on building in the Saturday Evening Post.



WILLIAM AIKEN STARRETT, 1877–1932

ILLUSTRATED NEWS

Fuermann and Sons

A DOMELESS STATE CAPITOL

Holabird and Root, architects, are associated with Joseph Bell DeRemer and W. F. Kurke in the design of this $2,000,000 capitol building to be erected at Bismarck, North Dakota. It will be the third State Capitol Building to be domeless, the Capitols of Nebraska and Louisiana now having towers instead of the customary domes. The rendering is by Gilbert T. Hall of Holabird and Root.

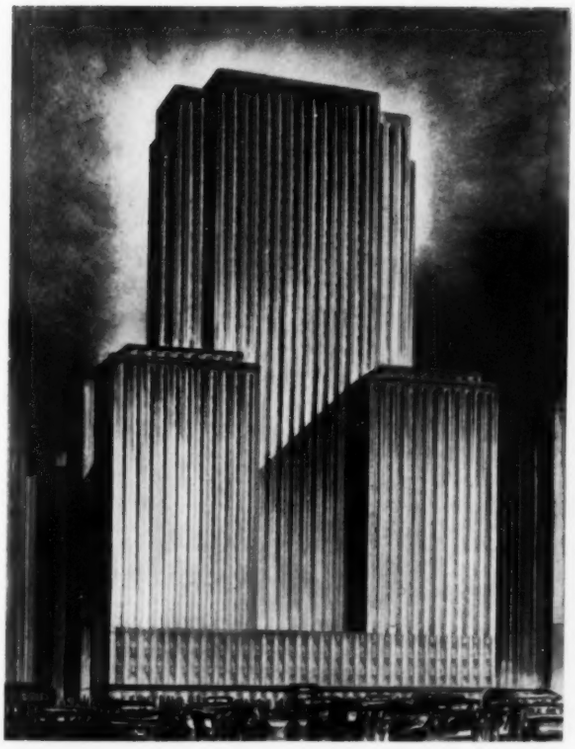
Westinghouse Photo

PUSH-BUTTON MACHINES FOR AUTO PARKING

This automatic parking machine, developed by the Westinghouse Electric & Manufacturing Co., allows the vertical parking of 48 automobiles within a ground area equal to approximately one seventh of that required by ordinary parking. This unit in Chicago is the first to be constructed as a commercial enterprise. The operation of the machine was described in the May 1931 issue of THE RECORD.

LOUIS LA BEAUME C. HOWARD WALKER
LOUIS JALLADE E. H. PRICHARD

Mr. Louis La Beaume, second from the left, is active at present, as Chairman of the Public Works Committee of the American Institute of Architects, in urging the enactment by Congress of legislation to decentralize the function of the office of the Supervising Architect of the Treasury, which relates to the design of public buildings. (This picture was taken while the Society of Beaux Arts architects was on its Pilgrimage to the Ecole des Beaux Arts in Paris last summer.)

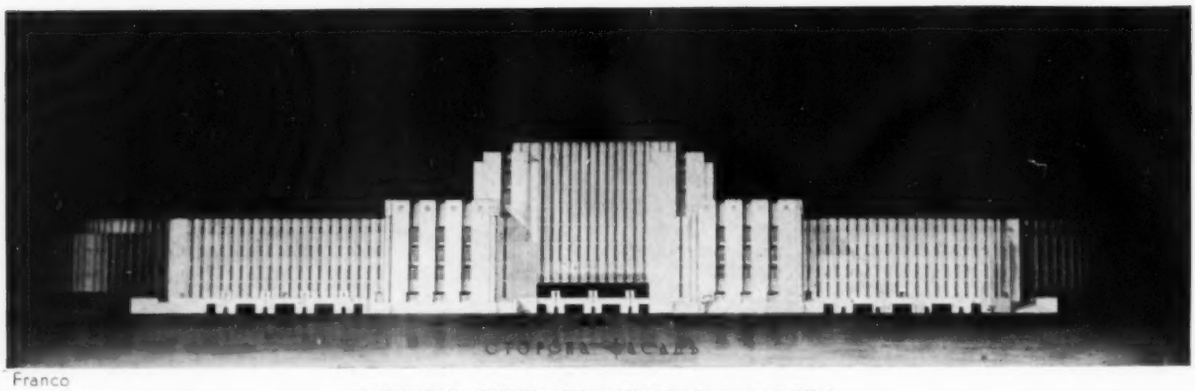


FIELD BUILDING, CHICAGO, ILL.
This building, designed by Graham, Anderson, Probst and White, architects, is now under construction on the site of the old Home Insurance Building, one of the earliest skyscrapers to be built in Chicago.

HOUSING PROJECT FOR LOWER EAST SIDE OF NEW YORK CITY
This rendering illustrates the first unit in a slum-replacement program. The building is designed by the Fred F. French Companies, who will also finance, construct and manage the development.

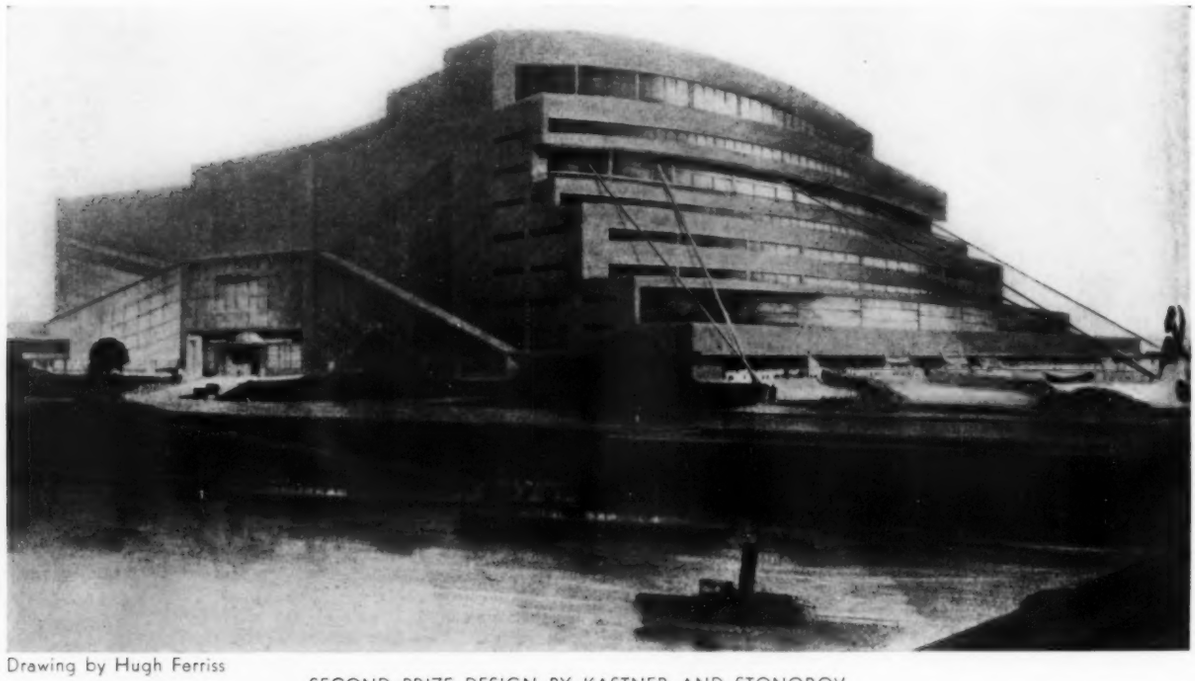
Woltz

WINNING DESIGN IN THE APPOMATTOX COURT HOUSE MEMORIAL COMPETITION
The War Department has announced this design by Harry Sternfeld and J. Roy Carroll, Jr., architects, and Gaetano Cecere, sculptor, all of Philadelphia, as the first award in the competition for a memorial commemorating the ending of the Civil War. The central shaft of this monument will be either granite or marble.



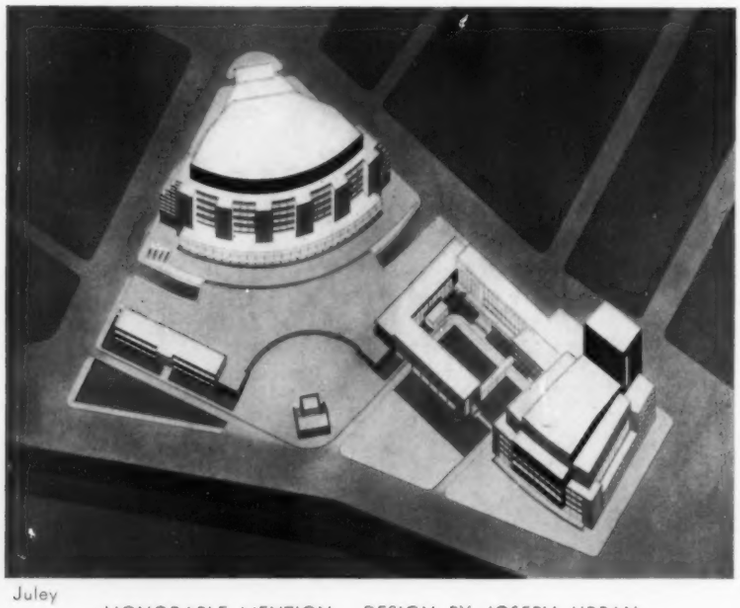
Franco

WINNING DESIGN BY HECTOR O. HAMILTON



Drawing by Hugh Ferriss

SECOND PRIZE DESIGN BY KASTNER AND STONOROV



Juley

HONORABLE MENTION — DESIGN BY JOSEPH URBAN

PRIZE-WINNING DESIGNS FOR THE PALACE OF THE SOVIETS IN MOSCOW

Hector O. Hamilton, New York architect, shares first prize with Professor I. V. Imoltovsky and B. M. Iofan, Russian architects, for the best Soviet Palace design. Alfred Kastner and Oscar Stonorov are second prize winners. Joseph Urban and Thomas Lamb are among the American architects to receive honorable mention in this competition.

The Palace of the Soviets will be one of the largest capitol buildings in the world. Two auditoriums, one of 15,000 seats and one of 6,000, are to be used for meetings of the Soviet Congress and other governmental bodies. The building will be completed by the end of next year.

NEW MATERIALS AND BUILDING METHODS FOR CHICAGO EXPOSITION

By NATHANIEL A. OWINGS

Construction of the exposition buildings of "A Century of Progress" (1933 World's Fair in Chicago) presents a problem totally different from the building of commercial or domestic architecture. Consequently, an analysis of these buildings shows a strange mixture of construction methods and materials. Methods used by our grandfathers may be found side by side with the most modern, prefabricated and standardized to the "nth" degree.

It is believed, however, that many of the departures from standard building practices outlined in this article are fundamentals which must be observed if the cost of construction is to be materially reduced. Summed up, these include:

1. Drastic revision of existing building codes.
2. Increase in the allowable stress of building materials, especially steel.
3. The acceptance aesthetically of the temporary look of a building, skimmed down to its essential requirements.
4. The substitution of a "skin" or thin surface covering for the exterior of buildings in place of thicker materials, which have been used primarily to give an impression of permanency, solidity and strength.
5. The willingness and ability of manufacturers to cooperate intelligently and efficiently in developing new materials and methods of construction.

Life of Buildings

The life of the exposition buildings is relatively short. This fact permits a great range in the use of materials developed by experimentation.

Demolition

Demolition at the termination of the exposition is mandatory. Therefore, ease of demolition is an important factor. The relative economy of materials is judged by their original cost. Theoretical salvage value is not taken into account, although to gain ease of demolition the tendency is to develop materials with a high salvage value.

Application of ribbed metal siding for exterior wall covering of main hall, Electrical Building.

Location of Site

The exposition grounds are on the shore of Lake Michigan, where high winds and violent storms are frequent during the winter season. These conditions have raised the standards by which materials chosen for use in the buildings must be gauged.

Soil Conditions

The site is on "made land," which consists of fill above the lake bottom averaging 20 to 30 feet in depth. This fill varies in consistency from a miscellaneous assortment of junk and rubbish to good sand. Beneath the lake bottom is a layer of soft silt-like clay and sand averaging 45 feet deep. Under this is found hardpan.

Test borings through the top fill, taken as close as 15 feet apart, give entirely different results, illustrating the difficulty of establishing a sound ground bearing value for spread foundations. Load tests made in various locations show a decided settlement below the loaded areas and a raising of the area immediately adjacent. This condition made necessary the use of a piling system.

FOUNDATIONS

Generally, a pile will drop 15 to 20 feet with the first blow of the hammer. Piles, averaging 65 feet in length, extending through the silt-like layer, are required to obtain a satisfactory bearing value. Since the column loads are generally small, the necessity of using a minimum cluster of three piles under each column makes a comparatively expensive foundation. To obtain economy, a system of using single piles under exterior columns and a minimum of two piles under interior columns has been followed. A 6-inch eccentricity is permitted in driving piles to exact theoretical location in reference to column center. A typical one-pile footing is shown in Figure 1. Exterior columns are connected by a wall beam between pile caps or column bases, as shown in section in Figure 2, to take the moment of the eccentricity about axis 2-2. The column, at right angles to the wall, is designed for a 6-inch eccentricity of load, placed with its strong section resisting the resulting moment, about the axis 1-1. The exterior pile caps are further tied to the interior pile caps with tierods placed below the surface of the ground to keep the wall piling from spreading out. The floor on fill is utilized to keep the wall piling from moving in. The column footings for interior isolated columns, with a minimum of two piles, shown in Figure 3, are arranged so that the moment, due to the eccentricity of the piling about axis 2-2, is taken by the value of the two piles. About axis 1-1 the strong section of the column is designed for the moment of the eccentricity. It is evident that this system reduces the number of piles required. Figure 4 shows a photograph of a typical piling layout.

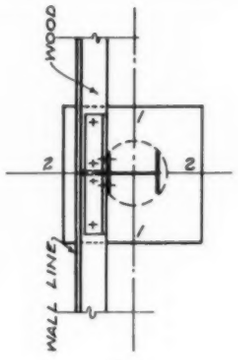


FIGURE 1
One-pile footing.

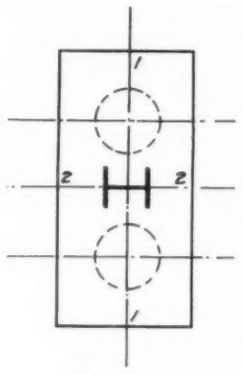


FIGURE 3
Two-pile footing.

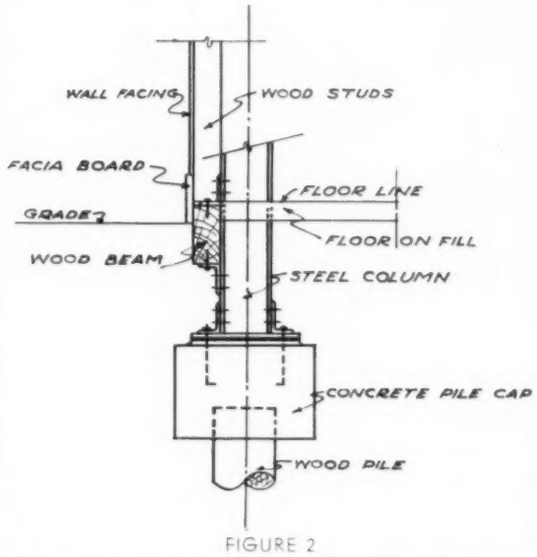


FIGURE 2

Footing and Wall Beam Detail

Reinforced concrete proves the most economical method of providing level foundation surfaces and easy anchorage for the column bases. Concrete has been used thus far for the wall beams to connect exterior column footings and to receive the exterior stud walls, as may be observed in Figure 5. Decided economy is obtained, however, by utilizing a wood beam of sufficient strength to take the possible moment of the eccentricity of the pile, plus the wall load; see Figure 2. This wood beam, of the same width as the studs, is connected to the exterior column above the column base with angles. This eliminates considerable excavation, expensive formwork and finishing of concrete beams, and further increases ease of demolition. A facia board is attached to the wood beam above grade to receive the exterior wall board facing, as illustrated in Figure 2.

FIGURE 4
Typical pile foundation layout, Hall of Science.

Fire Restrictions

To establish a uniform rating for fire insurance, the underwriters have established a Board which passes on each building. In general, they have stipulated that the buildings should be so constructed as to warrant an hour rating. To meet these conditions a steel frame is used with incombustible interior covering and, as approved by the Board, exterior covering to provide a one-hour fire resistance.

ECONOMY OF PLAN

For general exhibition requirements and for economy in foundations and in the use of steel, it has been determined that two-story structures are the most suitable. Comparative costs of piling and framing have been calculated for various spans of girders and consequent column and piling spacing. These have been set up in the charts, Figures 6 and 7. An ideal theoretical column layout, from an economic point of view, may thus be established, fully utilizing the piling to its ultimate capacity, and consequently further reducing the number of piles required.

From the charts for the various conditions, the most economical layout can be readily determined for preliminary studies. This layout, of course, must be altered in many cases to satisfy the requirements of the plan.

STEEL FRAME

Structural Steel

Structural-steel shapes are designed for unit stresses not to exceed 21,000 pounds per square inch and steel joists for 18,000 pounds per square inch, limiting deflections to 1/360 of the span. The structural-steel frame is a system of columns and girders supporting trussed steel joists. Bracing beams are used parallel to the joists on column centers. A module system of 20 feet is generally used as a standard, as this proves to be an economical joist span. Typical girder-to-column connections are field bolted to facilitate demolition, except where greater wind bracing is required. In such cases, connections are designed for wind and are field riveted.

Steel Trussed Joists

The joists are secured to the beams with a simple bolted clip assuring a full bearing and stiffened with bridging clipped to the top and bottom chord and spot welded to the steel beams parallel at either end of a panel (Figure 8).

Advantages of trussed steel joists:

1. Adaptability to either metal or wood decks.
2. Simplicity of connection with beams.
3. Open type of construction which permits the use of the space between the finished ceiling and the finished floor as a ventilating duct.
4. Greater economy.

Decorative Use of Exposed Steel

Exposed steel is utilized wherever practicable as a part of the decorative effect. In many cases the roof construction is designed so as to serve as the decorative ceiling. In one case indirect lighting has been used to cast the shadow patterns of the bar joists on the roof deck above. In the case of the Great Halls of the General Exhibit Group, which are to be about 50 feet in height, the steel columns will be exposed to the exterior of the wall on one side of the Hall and exposed to the interior of the opposite side of the Hall. Serving as a main feature of the decorative scheme, this will permit the use of a single stud wall and eliminate the necessity of boxing in or the furring of the columns.

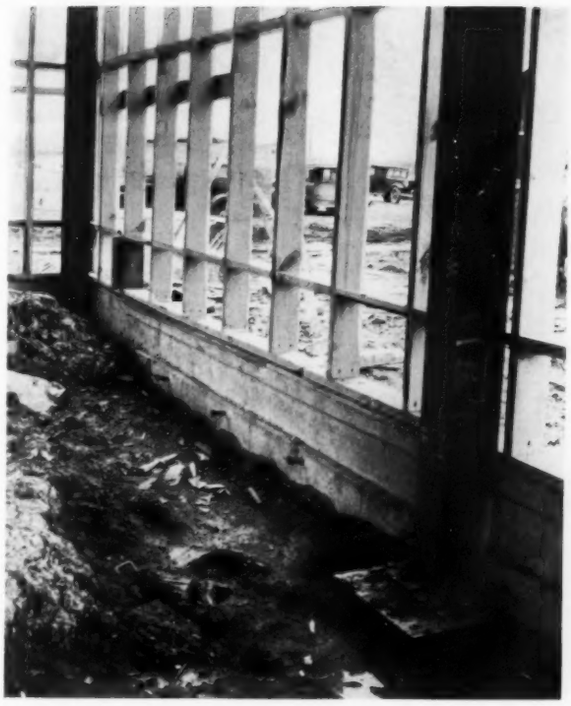


FIGURE 5

Typical column base and concrete wall beam supporting wood stud wall framing.

Use of Cantilever Construction

In some instances architectural design or concession space requires the extension of the exterior walls beyond the outer row of columns, in which case cantilever foundation beams, extending over the pile supports, are used for the outer row of columns to receive the wall beams, thus avoiding additional piles for the light wall loads. Projecting canopies are generally framed with cantilever beams for large projections and cantilevered wood joists for small projections, eliminating brackets or exposed rod hangers. The use of continuous girder framing, made possible by alternate panel girders cantilevered past columns to receive suspended intermediate girders, was given consideration. This was deemed impractical owing to a large variation in live load possibility compared with the extremely light dead loads. All cantilever framing is riveted.

Insulation

It is considered necessary to provide insulation in roof decks and exterior walls to exclude excessive summer heat.

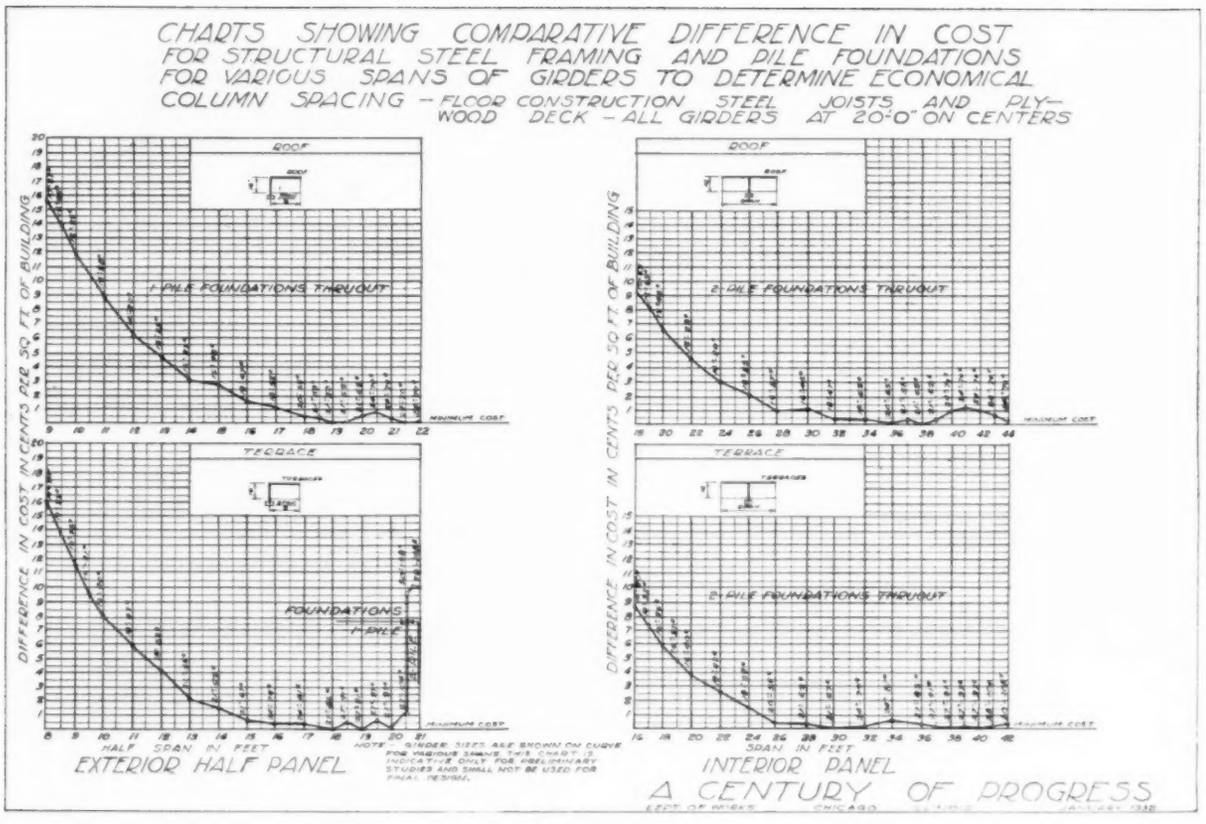
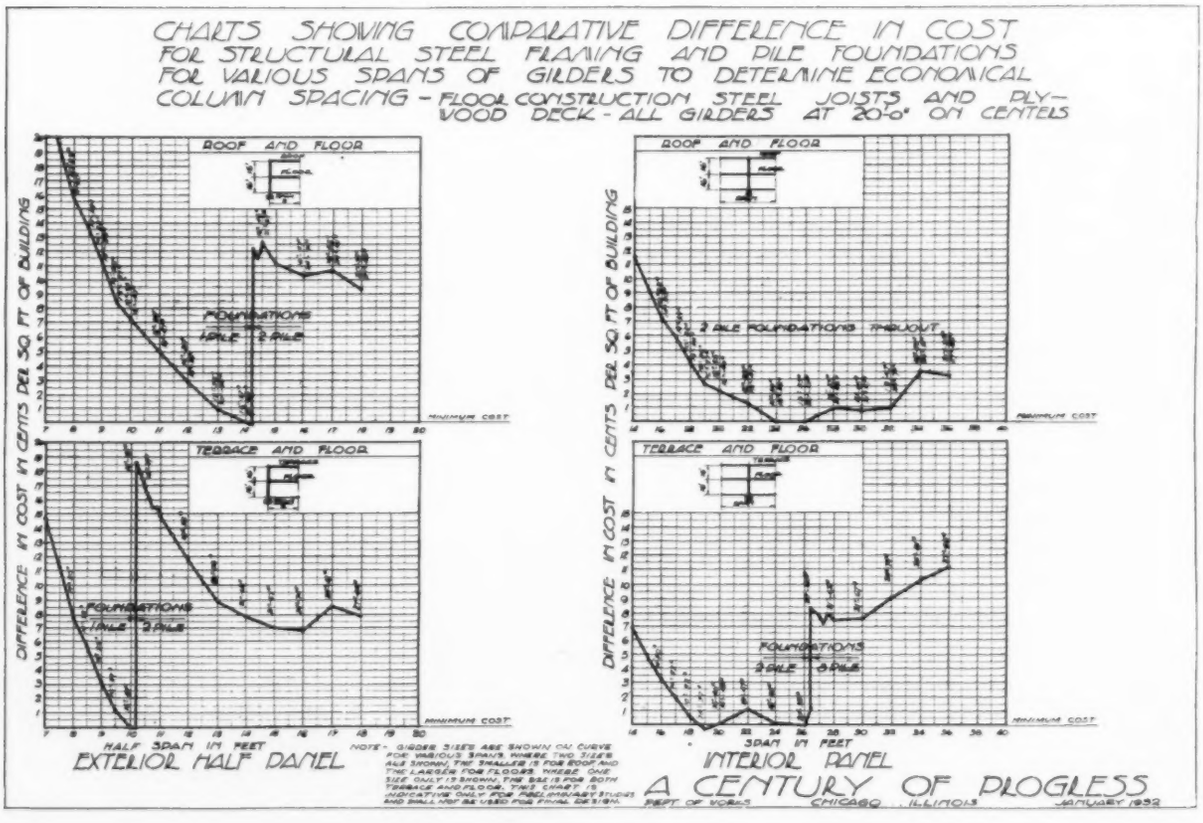

CHARTS SHOWING COMPARATIVE DIFFERENCE IN COST FOR STRUCTURAL STEEL FRAMING AND PILE FOUNDATIONS FOR VARIOUS SPANS OF GIRDERS TO DETERMINE ECONOMICAL COLUMN SPACING - FLOOR CONSTRUCTION STEEL JOISTS AND PLY-WOOD DECK - ALL GIRDERS AT 20'-0" ON CENTERS
ROOF
1 PILE FOUNDATIONS THRUOUT
2 PILE FOUNDATIONS THRUOUT
TERRACE
FOUNDATIONS 1 PILE 2 PILE
3 PILE FOUNDATIONS THRUOUT
DIFFERENCE IN COST IN CENTS PER SQ. FT. OF BUILDING
HALF SPAN IN FEET
SPAN IN FEET
EXTERIOR HALF PANEL
INTERIOR PANEL
A CENTURY OF PROGRESS

FIGURE 6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ROOF AND FLOOR
TERRACE AND FLOOR
FOUNDATIONS 1 PILE 2 PILE
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3 PILE FOUNDATIONS THRUOUT
DIFFERENCE IN COST IN CENTS PER SQ. FT. OF BUILDING
HALF SPAN IN FEET
SPAN IN FEET
EXTERIOR HALF PANEL
INTERIOR PANEL
A CENTURY OF PROGRESS

FIGURE 7

FLOORS

Floors and terraces are designed for a live load of 100 pounds per square foot and roofs for a live load of 25 pounds per square foot. "A Century of Progress" must furnish a finished corridor floor and a good subfloor for exhibit space. Therefore, in considering the merits and costs of various types of floor deck, the suitability of the deck for a subfloor, and the cost and relative difficulties of laying a finished floor on each type, must be taken into account.

Metal Deck

This type of deck is usually fabricated of 20-gauge steel with ribs 4" or 6" on center, ¾" or 1¼" deep respectively. Metal deck has been used in the Administration Building and in the Travel and Transportation Building. One type is made of individual interlocking units 6" wide and another in 16" widths with 4 ribs 4" on center in each unit. There are several makes of metal floor decks of this type available. Following are some of the conditions that have been experienced with metal deck:

1. Easily dented after setting; requires mastic fill to permit laying of finished floor.
2. No sound insulating value without mastic fill.
3. Relatively expensive without considering finished floor.
4. Requires a subfloor over mastic for exhibits.
5. Incombustible.
6. Presentable in appearance so that it can be left exposed underneath; permits omission of ceilings.

Plywood Deck

A five-ply ⅝" laminated Douglas Fir board, obtainable in large panels generally 3 by 8 feet is also used for decks. Extensive tests made on this material proved it to be of ample strength and of practically no shrinkage in any direction. The plywood is laid with tongue and groove joints, and is furnished by the mills with inspection to insure plies, thoroughly glued with water-resistant glue, free from starved joints.

The use of plywood for floors, roof decks and terrace decks has reduced the per square foot cost of the former floor deck system, which included the finished floor, by approximately one half. The Hall of Science and the Electrical Building have this type of deck throughout. Figure 8 shows this deck in place. The conclusions, as follows, reveal results of experience gained in using this material:

1. Laid in place at a very low cost.
2. Slow burning as used with incombustible ceiling below.
3. Serves as subfloor for exhibit space without additional covering.
4. Surface permits inexpensive finished floor.

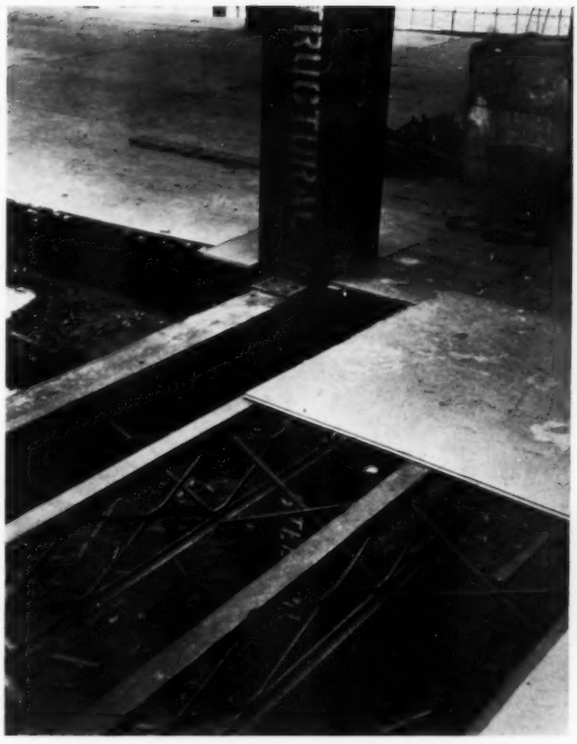

FIGURE 8

Typical plywood deck on steel truss joists, showing typical bridging.

5. Permits greater latitude of finishes for exhibitor.
6. Greater insulating value—permits ½" insulation on roof instead of 1" required with metal.

ROOFS

Coping tops on roofs and terraces are generally 4 inches above deck to permit blowing off of snow and to bring roofing membrane up over coping to serve as flashing. All roofs and terraces are pitched to drains. This has proved much safer and more positive than the dead level roof method of drainage. With the use of light construction it is practically impossible to assure a dead level roof. Two-ply tar and gravel membrane roofing is laid over insulating material. Where colored roofs are desired, canvas may be applied direct to plywood decks in lead and oil. This is used for roofs of cantilevered canopies, etc.

TERRACES

A ¾" precast asphalt plank tile laid over two-ply membrane roofing is the most economical type of terrace so far developed. Its resiliency, its non-slip quality and its lightness have made it safe, comfortable and economical, the main difficulty being that the colors in which it is obtainable are limited so far to black, brown and a dull red. Materially reduces dead load requirements over other types of terraces.

EXTERIOR WALLS

Practically all exhibit space is to be artificially lighted, permitting the exhibitor to display under the most favorable conditions. The illumination of the booths, consequently, is not variable due to the weather or the hour of the day.

The resulting large unbroken wall areas make the use of standardized units of wall covering economical. Over-all decorative treatments are obtained by the arrangement of the battens, which are required to protect the joints of the wall covering material.

Single Thickness Type

The most economical type of wall covering system would be one wherein a single thickness would serve as both the interior and exterior wall surface.

Attempts have been made to produce such a wall. All types yet investigated have contained a core of insulating material covered on both sides with a finishing material. One type has thin sheet steel on either side; another a veneer of asbestos cement board. Each type is available in standard sheets 4 by 8 feet.

The wind stresses on the standard bay of 20 feet center to center of column, and 14 feet floor to floor, require a horizontal girt and hangers, exposed to the interior, which are of such dimensions as to make any of these systems unsuitable for use as an interior wall surface. In domestic work where the ceiling height is less and the wind stresses lower, this system should prove of great value.

FIGURES 10 AND 11

Asbestos cement exterior wall finish, Administration Building.

FIGURE 9

Foundations, Administration Building.

Types of Studding

Many types of metal stud have been investigated, but have not proved as satisfactory or as economical as the ordinary wood stud wall construction. One type of metal stud was used throughout the Administration Building.

The stud wall construction is kept outside the steel frame with the wall covering material, both exterior and interior, placed directly on either side of the studs, leaving the steel column exposed. In general the studs are continuous for the full two floors carried on the wall beam at ground level. The air space obtained between the outside and interior wall covering serves as wall insulation. A wood fire stop, the full depth of the studs, is placed at the mid-point of each story height. All types of wall covering yet used require studs 2 feet on center with blocking behind all horizontal joints. This wall construction is evident in Figure 5.

WALL COVERING

Large unbroken areas require a more or less flexible wall covering, which can absorb expansion and contraction. Since paint is depended on for the exterior effect, the material must have a satisfactory surface for painting; it should be light enough to be erected easily, yet stiff enough to withstand wind; it must not warp easily; it should be fairly waterproof.

Asbestos Cement Board

This product is precast board made of asbestos and cement. It may be obtained in practically any thickness, from ⅛″ up to ¾″, in either flat or corrugated surfaces. Asbestos cement pipe is also available, varying in diameter from 6 inches to 5 feet. This material has considerable expansion and contraction and must be applied leaving ½″ spaces between all edges. Being 4 by 8 feet in size, the center of the board is nailed to the intermediate stud, and battens are applied over the joints so that the board is clamped between the batten and the stud; the screws are placed through the center of the batten directly into the stud, leaving the edges of the board free to expand and contract. On horizontal edges "Z" strips are necessary to act as flashing under this batten.

This asbestos cement board is relatively expensive, both in initial cost and cost of erection. It is quite heavy and extremely brittle. Difficulty has been experienced in obtaining a satisfactory paint job on this material. It is, however, extremely durable and has an excellent natural color. It has been used exclusively on the Administration Building and on parts of the Travel and Transportation Building.

Ribbed Metal Siding

This is made of 20-gauge interlocking steel, generally in 6″ wide units and available in any length up to 80 feet. The ribs or legs of the channel are ¾″ or 1¼″ in depth, as illustrated in Figure 12. This type of siding may be easily attached by clipping to horizontal girts 8 feet on center. It adapts itself readily without additional expense as a covering for curved surfaces. When used for exterior walls, it requires insulating material applied to the back, or an inside wall covering must be used.

So far no economical method has been developed to utilize the structure provided for the outside wall covering as the sole support for the interior wall covering. The principal objection to this type of wall covering, from an appearance viewpoint, is the narrowness of the individual unit; in fact, it is sometimes mistaken for wood siding. Though relatively expensive, this material has been used on the walls of the Travel and Transportation Building, together with asbestos cement, and on the curved surfaces of the Electrical Building and the Hall of Science. Figure 12 and the illustration on page 249 show the detail and application of ribbed metal siding.

Gypsum Wall Board

These are 4 by 8 or 4 by 12 foot sheets—¼″ to ¾″ in thickness. The board consists of a gypsum core, covered on both sides and two edges with heavy calendered paper. The boards are dipped in aluminum paint at the mill. Thickness must be suitable for strength and weatherproof qualities

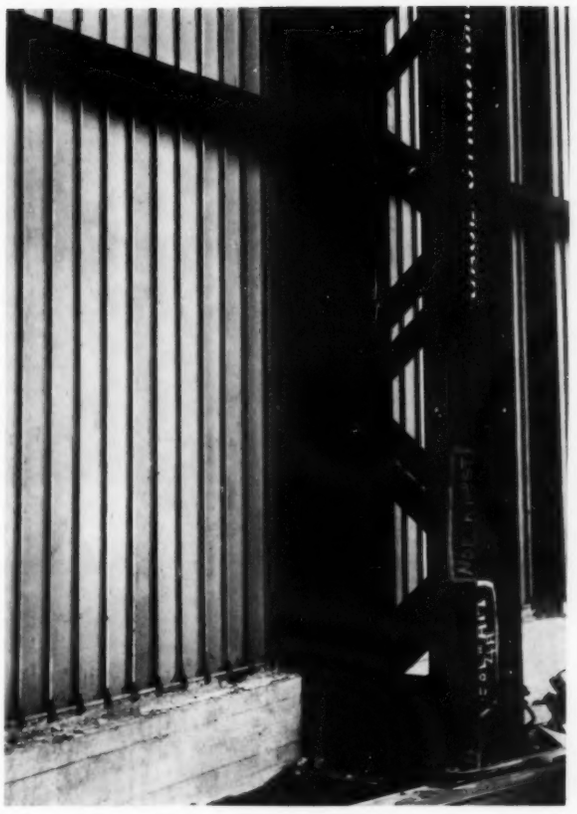

FIGURE 12

Typical ribbed metal siding for exterior wall covering, column base of Electrical Group Hall.

FIGURE 13

Typical sheet rock exterior wall covering.

FIGURES 14, 15 AND 16

Construction views: main hall and tower framing, Hall of Science.

for exterior wall covering. Boards are bent to curved surfaces at the mill by steaming. The long edges are placed horizontally and are tongue and grooved to weather; all joints are buttered with a waterproof mastic as they are placed; vertical joints are butt-edged and covered with battens. Fewer battens are required with this type of board. The initial cost of the material is much less than plywood and the cost of erection is about equal. This board provides the most satisfactory paint surface yet developed (Figure 13).

Plywood Wall Board

This is ½" five-ply Douglas Fir laminated board, generally obtainable in standard units of 4 by 8 feet, butt-jointed where battens are used vertically, ship-lapped on horizontal joints and where joints are exposed, thus eliminating "Z" strips necessary for weather-stripping the asbestos cement board. The specification is similar to plywood deck, except that boards are primed with hot linseed oil at the mill. Considerably less expensive in initial cost and cost of erection than asbestos cement board. Takes paint well; adaptable to curved surfaces and offers greater flexibility in developing decorative batten treatments. Large areas unbroken by batten may be had by using tongue and grooved board. It has been used throughout the Hall of Science (Figures 15 and 16).

VENTILATION

The large windowless buildings necessitate artificial ventilation in which an exhaust system is used. The space between furred ceilings and floor deck is utilized as a duct through which air is drawn to fan rooms from slots in the ceiling of each exhibit booth; door openings furnish the fresh air supply. This system has proven economical.

RAILINGS

Rails in general are of open type to permit long vistas and to increase the visibility from various levels.

A welded pipe rail, as illustrated in Figure 17, has been used thus far. Additional economy is obtained by the use of the rail, which has just been developed (Figure 18). This detail permits roofing membrane to be carried over parapet under coping to serve as flashing. The railing clips over the coping, eliminating piercing and consequent expensive flashing. The strut on outer wall face is lag screwed to wall structure. This type of rail reduces labor costs, requires no additional flashing and may be used with pipe or angles.

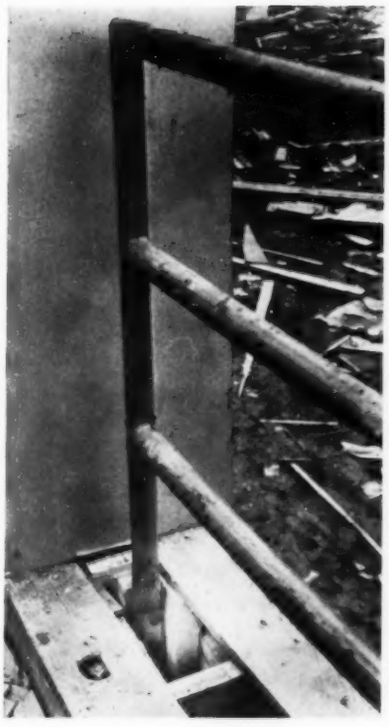

FIGURE 17

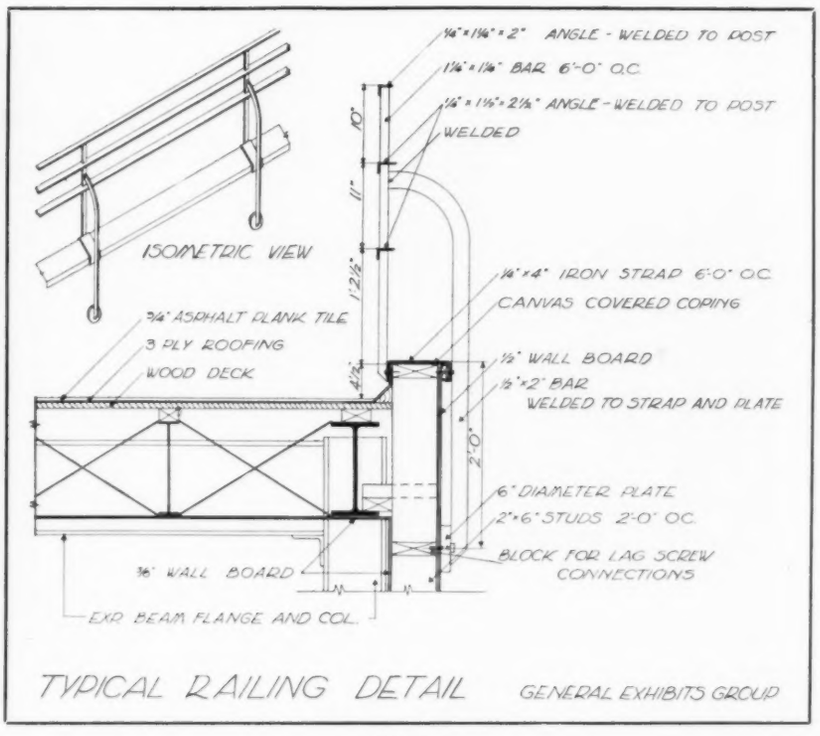

FIGURE 18

Typical exterior welded pipe railing and new detail, showing roofing membrane carried over parapet to serve as flashing.

DOORS

The doors are accordion type, made up of a series of solid panels hung on a track, thus permitting unobstructed openings necessary with great crowds. This system reduces hardware costs and allows the use of the least expensive type of door.

SPECIAL CONSTRUCTION

Each of the buildings has an architectural feature such as a large hall, tower, or other attraction requiring special design. Figure 19 shows the frame of one exterior wall of the main hall of the Hall of Science. The hall is 50 feet high in the clear, 56 feet from floor to roof deck. The roof is framed on trusses of 60-foot span. The photograph shows, secured to horizontal girts, the wood studs which are to receive interior wall board. The unusual light effect is caused by daylight filtering through an open pattern work in the triangular-pointed bays erected on the exterior of the wall. These bays extend the full height of the wall and form the decorative feature of the exterior façade. This pierced pattern produces an interesting shadow pattern in daylight and, illuminated from within, presents an ever-changing color pattern at night.

The great exhibition hall of the power section of the Electrical Group is curved in plan, 500 feet long, and varies in stepped-up heights of about 56, 64 and 72 feet. The roof is supported on 48-foot span girders radiating normal to the curvature of the wall. The columns, which can be seen in Figure 12, are composed of two H-shaped sections laced together to give sufficient stiffness for the great height. Horizontal girts, 8 feet on centers, to which the metal wall facing is attached, frame to the columns. The columns, girders, roof joists and underside of the metal roof deck are to be left exposed.

The location of this great hall on the edge of an island, directly exposed to the open lake, shows the necessity for the rather heavy steel.

Figures 20 to 23 inclusive are of the Railroad Dome unit of the Travel and Transportation Building. This structure has the most unusual framework that has been introduced into the Exposition Buildings to date, and probably involves construction that has not been similarly used for buildings anywhere heretofore. This feature is the suspension of the roof deck construction from cables, exposed above the roof and hanging in catenary curves from the top of columns which project above the exterior walls surrounding the hall.

The cables have a center to center span of about 208 feet; the columns extend 150 feet above the

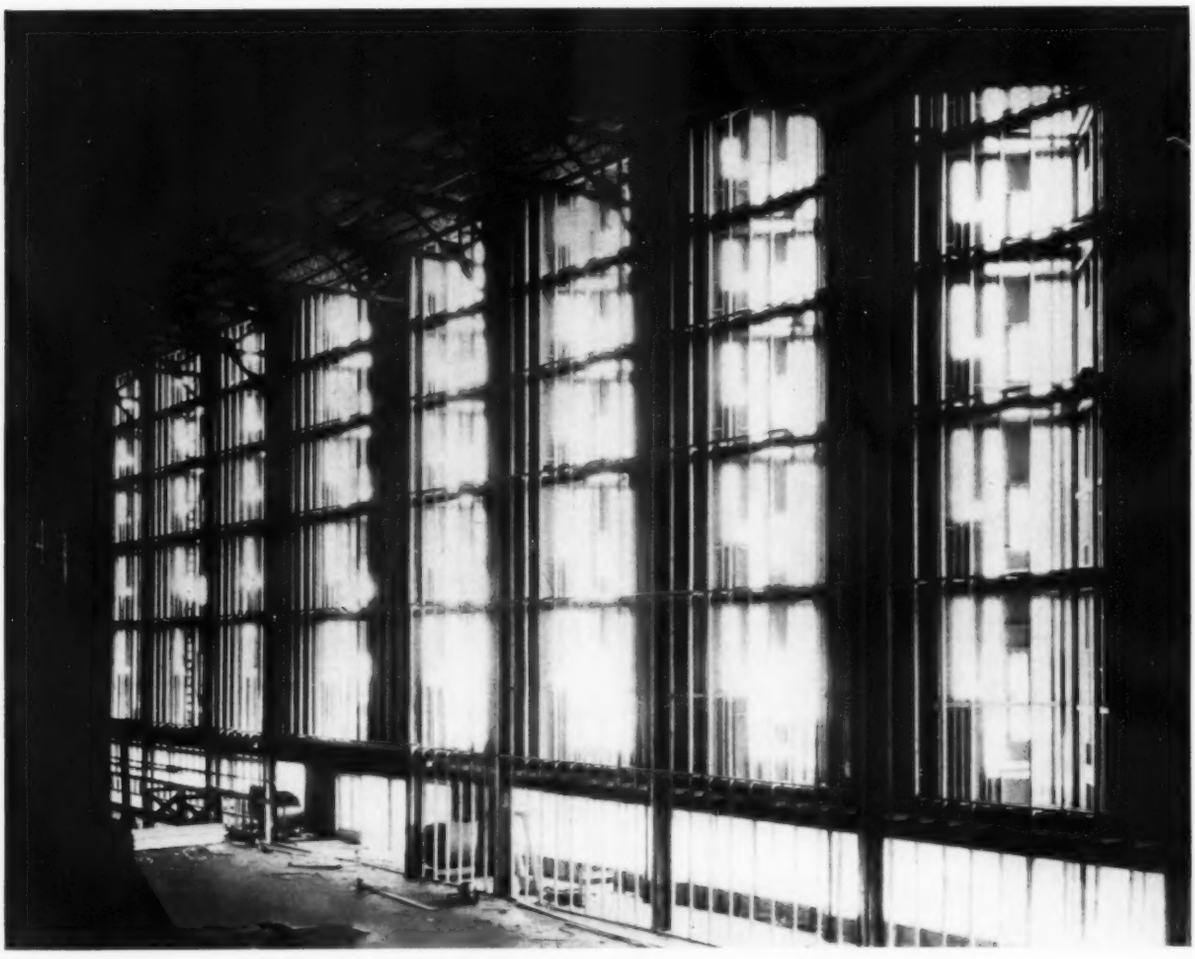

FIGURE 19

Interior of Main Hall, Hall of Science

floor; the crown of the dome is 125 feet high; the edge of the dome is about 100 feet above the ground. There are three columns in each quadrant of the circle of the Hall thus formed. The roof deck is supported by hangers from the cable as shown. Anchorage cables or back stays extend down and out from the top of the columns to concrete deadman anchorages in the ground, located 50 feet away from, and radially in line with, the columns. The back-stay cables resist the horizontal pull of the suspension cables toward the center of the dome.

The roof construction consists of a metal-ribbed deck supported on light channel purlins which frame into radial ribs consisting of light beams. Figure 22 illustrates the web-like roof structures being erected without centering.

On each of the four sides of the structure there is a large window, built not to light the interior, but rather as an exterior lighting effect. A continuous cyclorama will line the interior of the walls. Between the cyclorama and the windows, an illuminating apparatus will be provided to give a scintillating lighting effect of various colors in motion for exterior decorative treatment at night. The exterior wall between the windows does not follow the circle on which the columns are placed, but forms recessed "V"s" between each column. At the inner angle of these "V"s" and at each side of the window panels, projecting fins extend vertically, housing lighting units to illuminate the adjacent wall surfaces.

A low structure surrounds the domed hall, extending about 50 feet out, and the back-stay cables terminate at the deadman anchorages within the low structure, as though the cables were held by buttresses on the face of its walls; these cables are at a sharp angle with the columns. A slight increase in stress and a consequent slight elongation of the back-stay columns, due to snow load on the roof, or wind loads, will permit the top of the columns to move in toward the center of the structure. The maximum horizontal movement of the top of the columns may be 6 inches. As this movement occurs, the suspension cables will sag causing the crown of the dome to drop down. To

(Continued on page 40, advertising section)

Announcing

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Distinctly Handsome—with amazing economical qualities . . .

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This "slip" speeds up the painter without hurrying him . . . materially reduces time and labor costs . . . by far the greatest painting expense.

Then, too, there is less paint to buy when Barreled Sunlight Flat Wall Finish is used. Its paint-saving spreading power has been proved to be from 16% *to* 50% *greater than that of other high-quality flat paints.* This without loss of effective coverage.

When the job is done—savings continue. Barreled Sunlight Flat Wall Finish dries smooth—tight. No brush marks—no laps. It is dirt- and dust-resistant—easy to wash.

You can reduce your appropriations for flat paint by specifying this sensational new Flat Wall Finish.

Write for further details to U. S. Gutta Percha Paint Co., 22-D Dudley St., Providence, R. I. Branches or distributors in all principal cities. (For Pacific Coast, W. P. Fuller & Co.)

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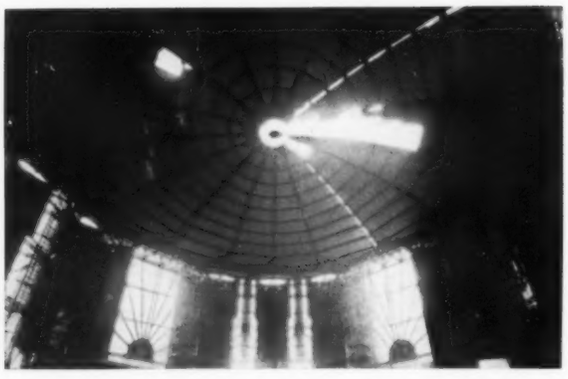
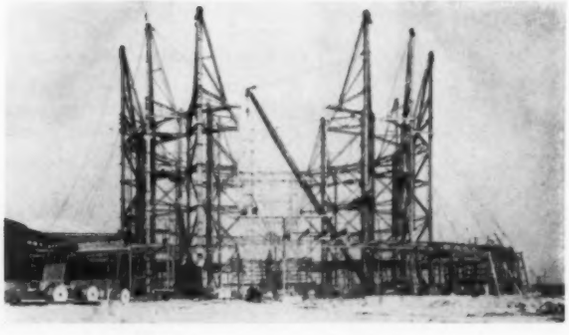




FIGURES 20, 21, 22 AND 23

Railroad dome suspended from cables, Travel and Transportation Building.

(*Continued from page 288, editorial section*)

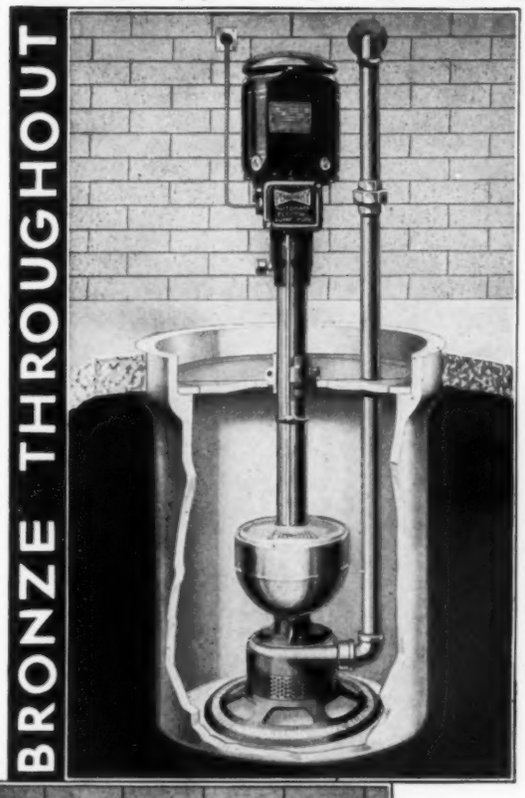
permit this movement in the structure, a system of joints is used. Each set of three columns is rigidly braced to move as a unit, and all the columns have rocker bearings. As each group of columns moves in, the wall surface attached to the framework moves in also, forming a truncated cylinder effect. To permit this, the wall sections with the windows are suspended from trusses at the top, which are supported on sliding bearings at the adjacent columns. The walls have vertical interlocking joints at either side of this suspended surface to permit the truncating of the wall surfaces. Horizontal trusses at the top and bottom of these suspended walls take the wind stresses to each group of columns. To permit the crown of the dome to drop, it is quartered by four radial lapped joints, thus permitting the perimeter to adjust itself to this movement. The circumferential edge of the dome overhangs a gutter deck secured to the column and wall framework, permitting the top of the walls to move in, the gutter moving in with it under the edge of the dome. All of these movements occur gradually as the weights of the component parts of the structure resist the movement with their inertia.

The use of this suspension design developed from the following assumptions and analyses:

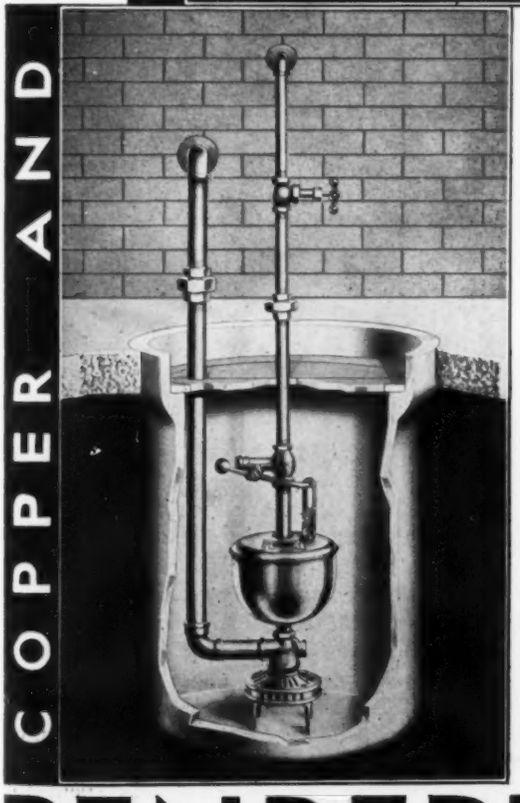
1. Vertical interior wall surfaces of great heights were desired for an interior panoramic light mural and dramatic lighting of exhibition space from above.
2. This would make necessary a heavily-braced wall construction supporting a ring dome framework.
3. High tensile strength of cables permits taking the roof load to wall columns, which in turn support the loads in direct compression to the foundations. A much lighter construction of the roof results by introduction of frequent hangers from the cables.
4. The suspended roof construction is easily erected by working out progressively from the center intersection of the cables. This procedure eliminates costly centering which would have been required for erection of a ring dome. This is evident in Figure 22.
5. The exposed cables and upper extension of the columns provide an unusual architectural feature for an exposition building.

The results of the tests and the research work of various types of materials used in the construction of "A Century of Progress Exposition" naturally cannot be considered as final or complete. As a matter of fact, the work has actually just begun; the surface has barely been scratched. Observations on various materials are intended in no way to be a condemnation of them. Further study may reveal that certain materials, abandoned or not used at the present time, have under different circumstances extremely valuable and additional uses than they have hitherto been regarded as possessing. Future researches into the utilization of materials, as the building program of the exposition progresses, promise to yield some highly interesting and significant results.

A few reasons why— many Architects specify..



TRADE PENBERTHY PRODUCTS MARK



TO dispose of seepage below sewer level—or where sewerage facilities are not available—many architects prefer one of the units illustrated here. Local conditions determine whether the electric or hydraulic unit will be most economical—but both pumps have many characteristics that appeal to the architect.

Both the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Hydraulic Cellar Drainer are immune to corrosion—they are copper and bronze throughout. Both are thoroughly dependable under the most severe operating conditions, and are economical of electricity and water power. They are fool-proof, require no kid-glove handling, and are easy to install.

Manufacturing a complete line of both electric and hydraulic units in a full range of types and sizes, the Penberthy organization is especially well qualified to recommend the correct equipment for any specific case. Leading jobbers throughout the country stock both electric and hydraulic units.

PENBERTHY INJECTOR COMPANY
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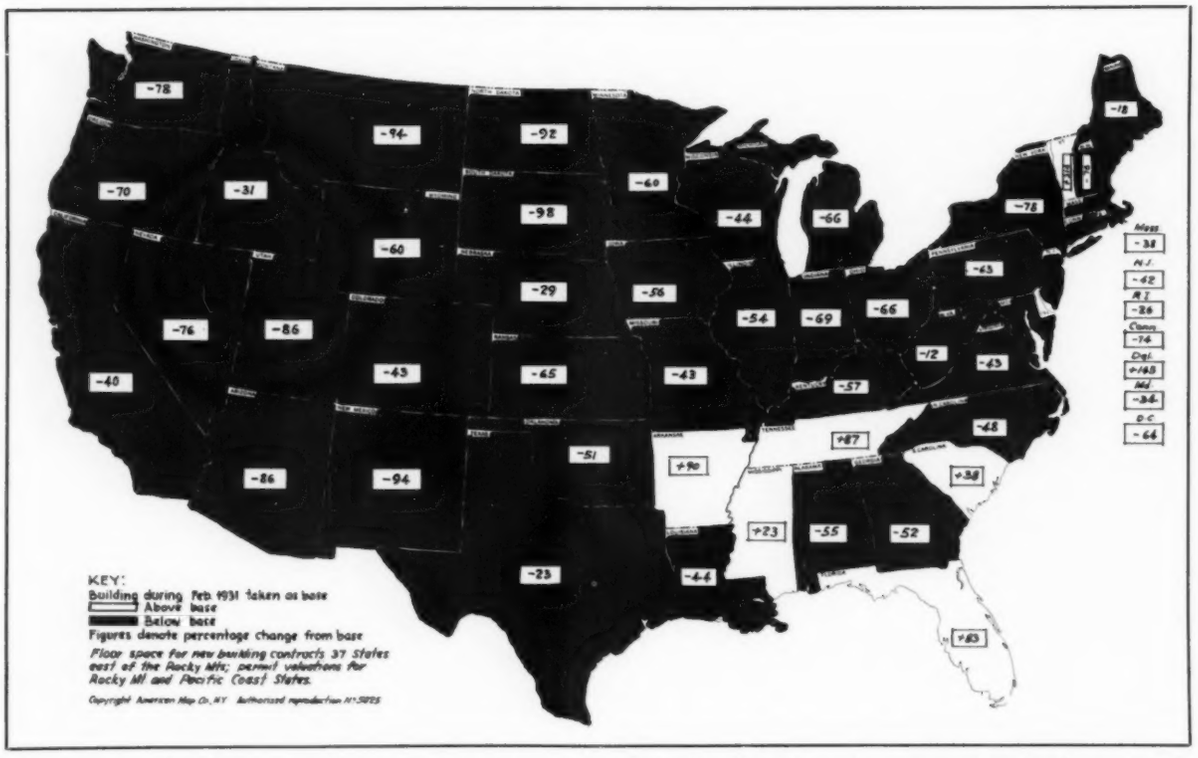


The February building map showed seven states east of the Rockies where floor space totals of new building contracts were higher than in February, 1931: Vermont, Delaware, South Carolina, Florida, Tennessee, Mississippi and Arkansas. In January the map showed only six states where awards were higher than in the corresponding month of last year, while the December 1931 map showed eight states with higher contract totals. Of the states to show gains in February over a year ago, Vermont and Delaware reported increases for the third consecutive month. Of all the states that reported losses in February as compared with 1931, the best relative conditions were shown for West Virginia where the decline was 12 per cent, and Maine, with a decline of 18 per cent. The poorest states comprised New York, Ohio, Indiana, Pennsylvania, Connecticut, Kansas, Minnesota and the Dakotas, where the losses were in excess of 60 per cent.

BUILDING TRENDS INDICATED BY THE FEDERAL CENSUS

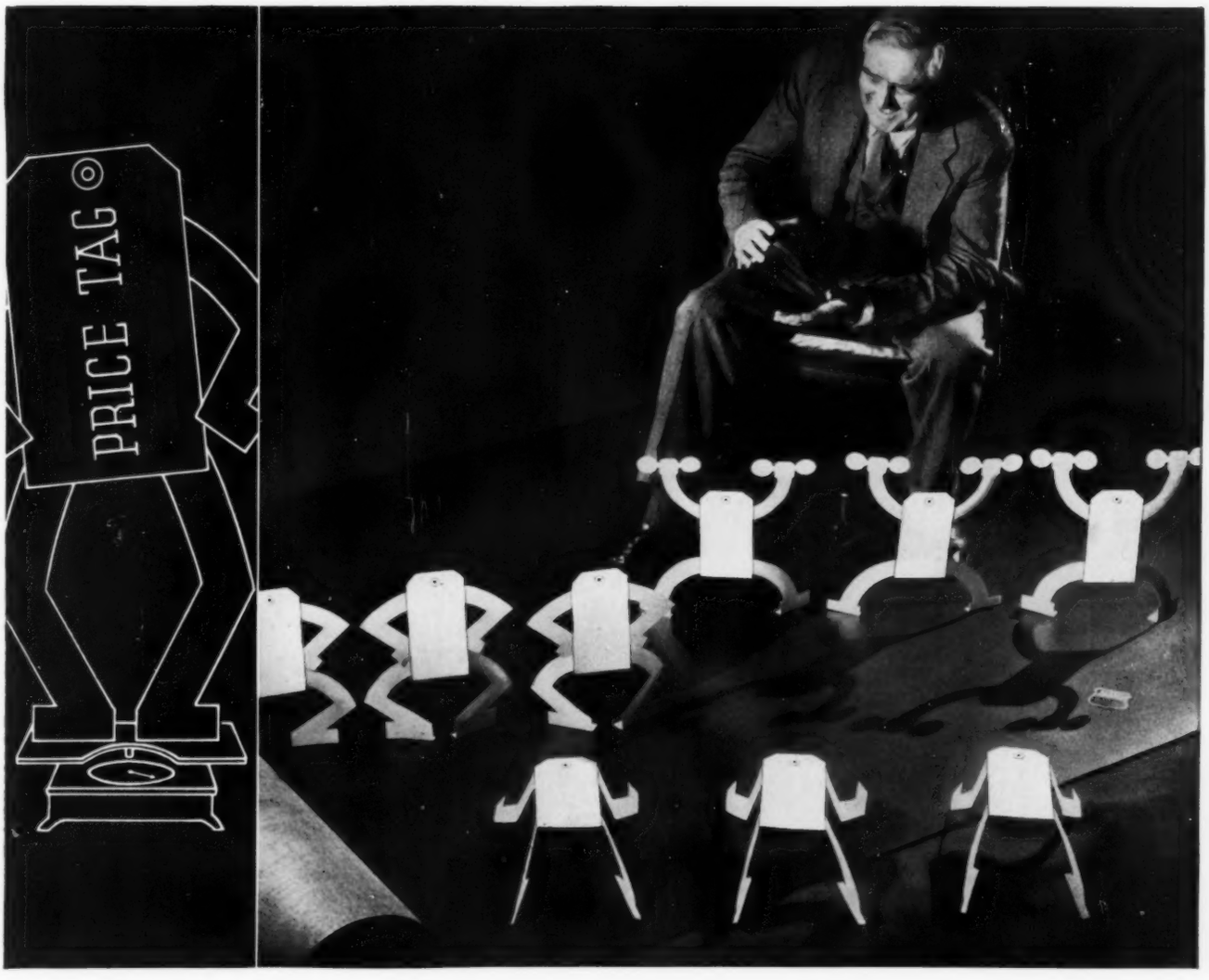
PART 7—THE OUTLOOK FOR CHURCH CONSTRUCTION

By L. SETH SCHNITMAN

Church architecture in America appears destined to undergo fundamental changes. As we come to recognize a varying social and economic structure, our churches will rely more heavily on income-producing facilities for support. The church structure of the past will very likely continue to be the pattern until we more fully appreciate the new forces, but as the difficulties of raising necessary monies increase and the competition for the charity dollar enlarges, self-preservation will dictate new structural forms. Then our churches will once again become landlords and our real estate interests will face a new competition in the sale of housing and office space.

New churches erected throughout the United States during the ten-year period, 1921-1930, inclusive, showed a contract value approximating $1,100,000,000. During the same period total construction of all descriptions aggregated $71,800,000,000. Thus it will be seen that $1.56 was expended for new churches for each $100 of all other classes of work. It is perhaps of far larger interest to compare church construction with residential building over the period; on this basis, approximately $225 went into new churches for each new housing unit representing $5,000 of residential contracts. (Approximately 4,900,000 housing units were erected during this decade.)

For the thirteen largest American cities, i.e., those having 500,000 or more inhabitants in 1930, new church building during the decade totaled approximately $275,000,000. These were the cities that accounted for almost 40 per cent of all new housing units which were erected in the United States during the ten-year period. Yet for these thirteen largest centers only $142 was spent for new church buildings for each new housing unit ($5,000) erected. These cities, housing 17 per cent of our entire population and 30 per cent of our urban population, accounted for 25 per cent



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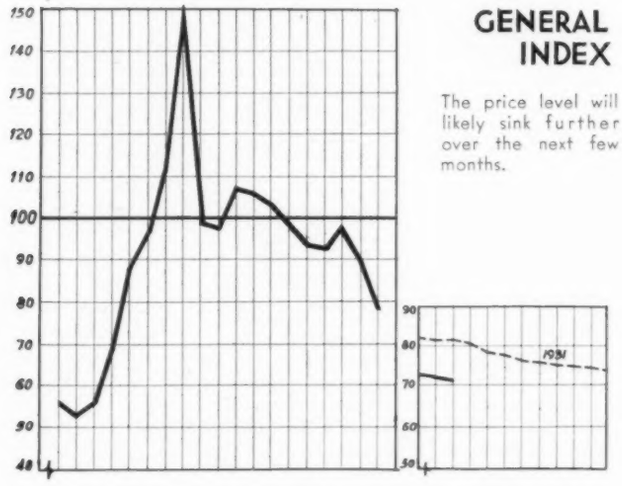
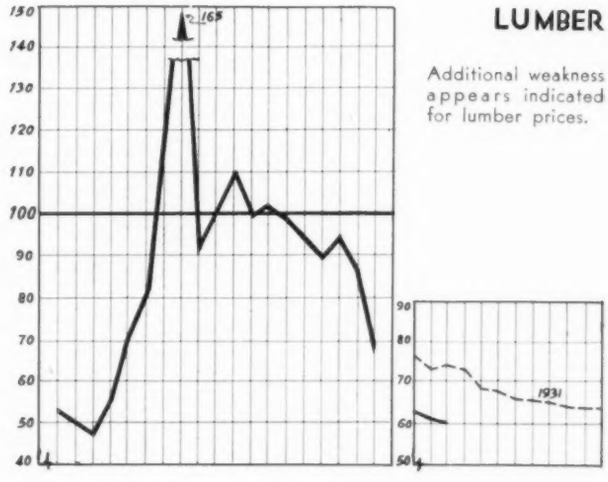


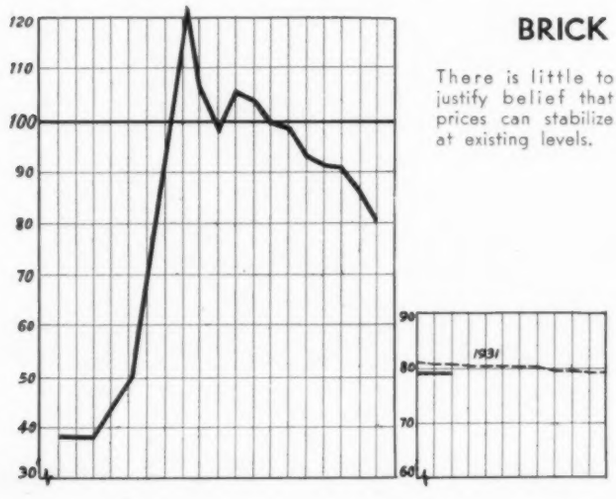
GENERAL INDEX

The price level will likely sink further over the next few months.



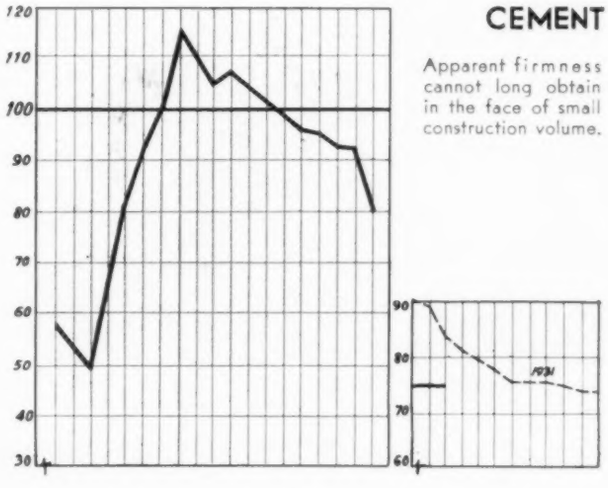
LUMBER

Additional weakness appears indicated for lumber prices.



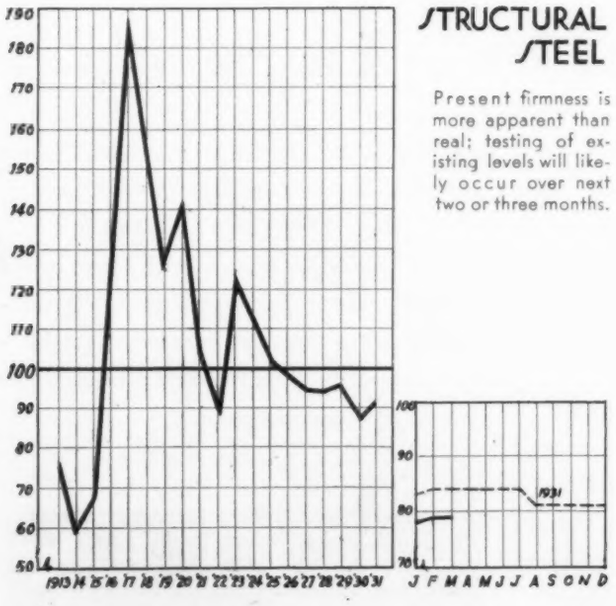
BRICK

There is little to justify belief that prices can stabilize at existing levels.



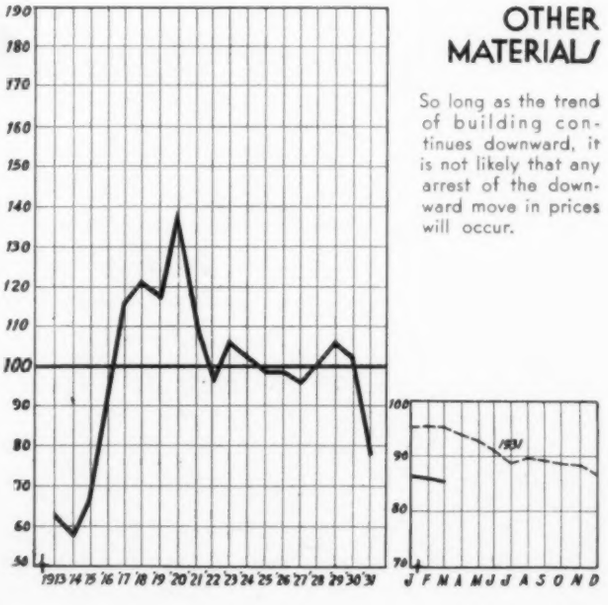
CEMENT

Apparent firmness cannot long obtain in the face of small construction volume.



STRUCTURAL STEEL

Present firmness is more apparent than real; testing of existing levels will likely occur over next two or three months.



OTHER MATERIALS

So long as the trend of building continues downward, it is not likely that any arrest of the downward move in prices will occur.

The MAGNIFICENT National Newark Building

The National Newark Building
Newark, New Jersey

Architect: John H. & Wilson C. Ely, Newark, N. J. *Htg. & Vent. Engr.:* Meyer, Strong & Jones, Inc., New York City. *General Contractor:* Starrett Brothers & Eken, Inc., New York City. *Heating Contractor:* Baker, Smith & Co., New York City. *Plumbing Contractor:* Jaehnig & Peoples, Inc., Newark, N. J.

"Every commercial convenience and luxury that modern architecture can provide" is incorporated in the new National Newark Building. Fronting on three streets at the heart of Newark and rising to a height of thirty-four stories, the building assures to its tenants permanent advantages of sunlight and ventilation.

Every effort has been made to embody the best and the most practical in planning, in style, and in building construction and equipment, conforming with the ambition and pride of the growing, progressive, and successful city that Newark is.

The makers of NATIONAL Pipe record with satisfaction the name of the National Newark Building to be added to the long list of distinguished buildings in which, for the major uses of pipe, NATIONAL has been installed. Every such choice reconfirms NATIONAL as—

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NATIONAL PIPE

of the value of all new church buildings.

From these facts it is clear that church construction in our smaller urban centers and suburban areas was relatively more active than in our largest cities. This is not surprising, since these largest cities showed a population growth between 1920 and 1930 of only 23.8 per cent as against a total growth in urban population between the two census years of 26.9 per cent.

To be sure, conditions varied rather widely for each of the thirteen centers. In New York City, where new residential building over the decade approximated $4,500,000,000, church construction amounted to $89,000,000; for each new housing unit only $99 of new church building was undertaken. In other words, New York City, which accounted for 19 per cent of all new residential building, produced only 8 per cent of the total value of new churches. How can we account for such a small relative amount of church building in the face of a population gain in this city of upwards of 23 per cent from 1920 through 1930?

In Buffalo a sharp contrast is found; here new church buildings during the decade showed $441 for each new housing unit. For Philadelphia, Baltimore, Pittsburgh, Buffalo, Cleveland, Milwaukee, St. Louis and San Francisco the ratio of new church work to residential building was higher than the average of $142 shown for the thirteen cities combined, while for Boston, New York, Chicago, Detroit and Los Angeles the ratio was lower than average. It is probably more than a coincidence that four of these latter centers were among the five largest American cities. Whatever the causes, it appears certain that over the next few years our largest cities will show a smaller ratio of church construction to residential building than obtained during the decade which ended in 1930, unless a new church building economy is conceived.

The experience in church construction over the ten years, 1921-1930, inclusive, in five cities in the 100,000 group selected at random, is here of interest: Des Moines, Lowell, Bridgeport, Reading, Richmond. In each of these cities the ratio of new church construction was in excess of $350 per new housing unit. For Reading the ratio was $566; for Des Moines, $443; for Lowell, which reported a decline in population between 1920 and 1930, the ratio was $410; for Bridgeport the ratio was $374; and in Richmond $364 was expended for new churches for each new housing unit. On the experience in these cities it is likely that over the next few years the relationship between new church building and residential work in our smaller centers may hold at approximately the levels which existed during the decade that ended in 1930.

It is probable in the light of the results during 1931 and thus far in 1932 that the annual total dollar volume of new church building throughout the country for some time to come will be on a lower level than has existed since the war. It is probable, also, that an increasing economic consciousness, now that our population growth-rate is being substantially altered, will produce a more material attitude towards church architecture, especially in our largest cities.

Out of these rather imperceptible processes a new structural conception will likely arise which will give greater economic utilization of land. New York City has already produced combination structures such as church-office and church-apartment buildings. Now that our population is growing older and that in a few years 40 per cent or more of our people will be in middle life or above, it is not unreasonable to suppose that economic pressure will force our churches to turn to revenue-producing buildings for a new means of support. Pretentiousness of exterior design will give way to functionalism and a typically American church architecture will arise.

In our smaller cities and suburban areas where free land abounds, church architecture over the next few years may still be patterned after existing modes. Whatever the course, it is probable that the present tendency of population growth and population shifts, the increasing competition for the charity dollar, the ascendancy of economics, to say nothing of the other manifold social changes which lie ahead, will leave large impress upon the future of American church architecture.

PUBLIC FINANCE STRONGLY INFLUENCES BUILDING OUTLOOK

Recent developments in public finance have overshadowed all domestic happenings of importance to business and industry. Taxes, budgets, economies—these are a few of the outward evidences that have assumed imposing proportions. It is hard to see how improvement in business may occur until the uncertainty which surrounds the whole question of public finance—local, state and national—is dissipated.

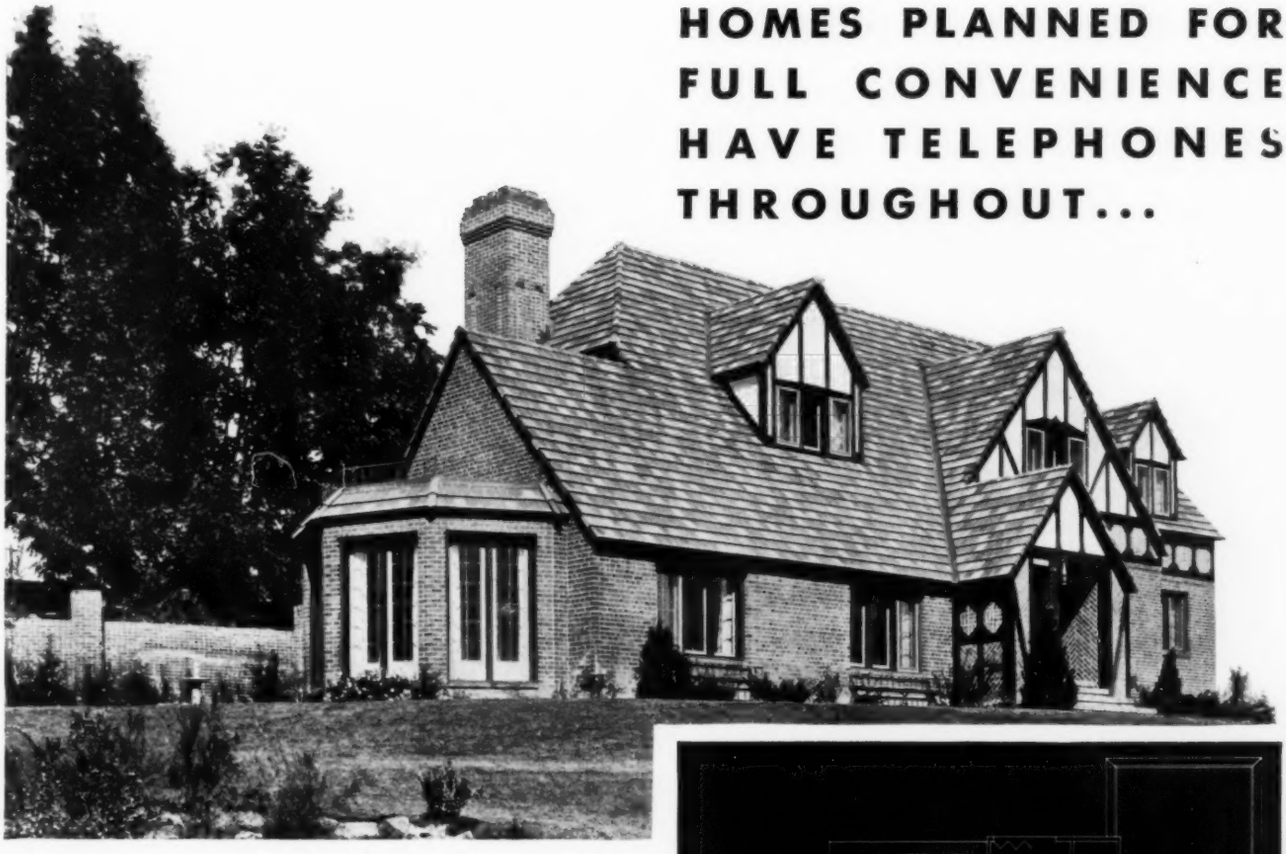
That the problem is being isolated gives rise to the hope that this factor may soon be removed. The chaotic state of public treasuries is not the only influence limiting the return of more normal construction volume, but if private capital could be certain that governmental agencies intend to live within their means, then our dollars would become more intrepid and we should ultimately find a reflection in larger construction undertakings.

Prosperity still depends upon the production of wealth, on the output of wealth-producing facilities, such as buildings, and not so much upon the production of the necessities or comforts of life which are quickly consumable.

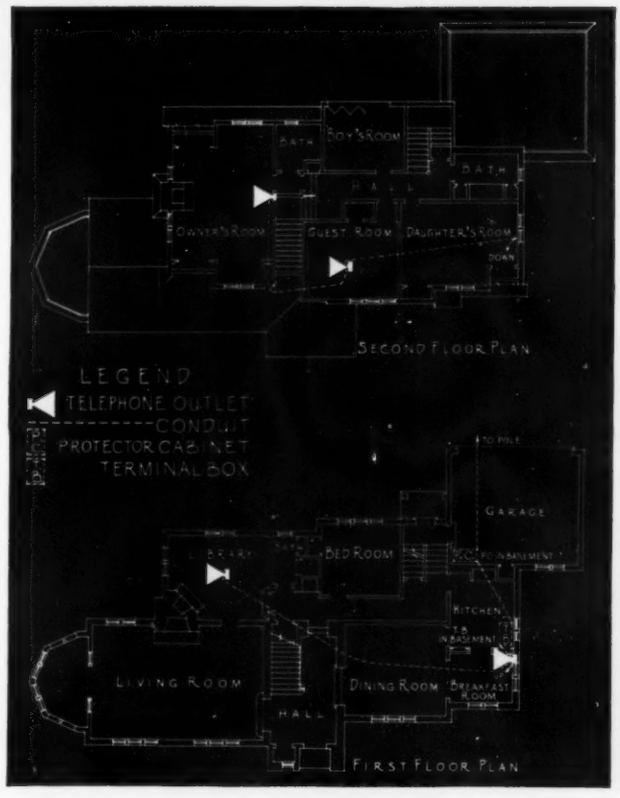
In the meantime corporate and municipal bond issues continue to trend downward with no indication of any nearby important turn for the better.

Little improvement in the trend of construction may be expected until the continued decline in corporate and municipal issues has been arrested.

HOMES PLANNED FOR FULL CONVENIENCE HAVE TELEPHONES THROUGHOUT...



Telephone convenience is provided for in the residence of Mr. S. J. Simonson, Stanley Park, Yakima, Washington, by built-in conduit connecting five outlets, including one in the basement. E. G. THERNELL, Architect, *Yakima.*



CLIENTS are pleased when time proves their homes livable, comfortable. And no one factor contributes more to living comfort than adequate telephone arrangements.

You can easily provide for full telephone convenience by planning in advance—by including telephone conduit in the original specifications. Built into walls and floors, the conduit permits time-saving, step-saving telephones to be located wherever they're wanted, throughout the house. In addition, it conceals all wiring, protects against most types of service interruptions, and allows for future expansion to meet changing needs.

When you're planning a new or remodeled residence, consult your local telephone company. They'll be glad to work with you and advise you on the best telephone arrangements for your particular project. There is no charge. Just call the Business Office.

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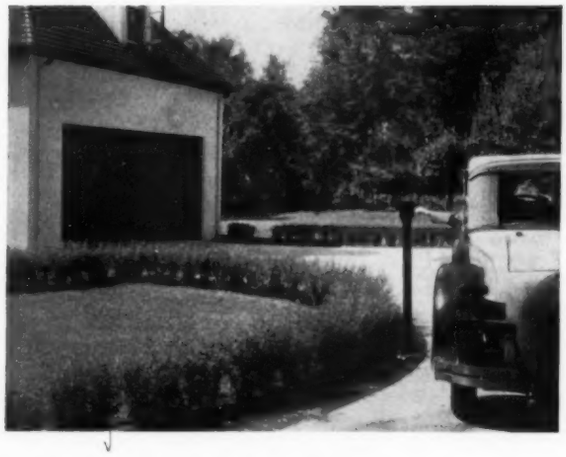


GARAGE DOOR OPERATORS

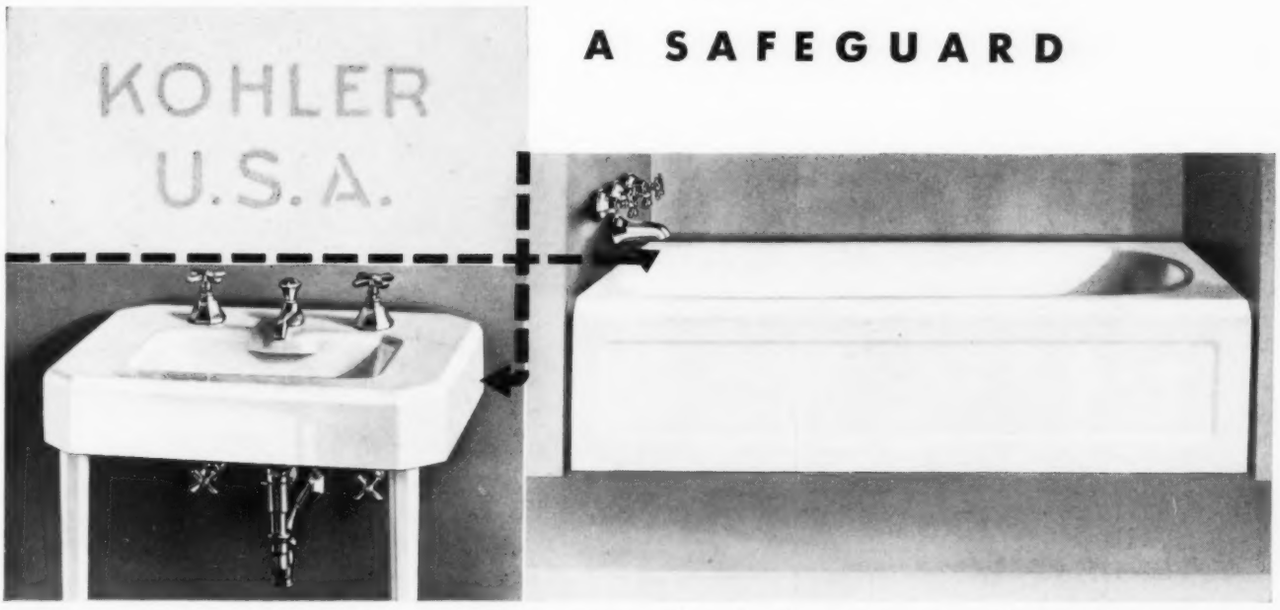
Garage door operators with remote control is a new feature that is being experimented with for residential buildings. Several such operators have been used with some success, including the use of the automatic type operated by the photo-electric cell. One of the most popular type of remote controls for this purpose is the switch-controlled operator manufactured by the Barber-Coleman Company of Rockford, Ill.

This operator is controlled by turning a key in a switch, located on a post which has been set at some convenient point in the driveway so that the driver may, by merely leaning out of the car, insert the key to the switch which automatically sets the operator in motion, opening the garage door.

The driveway post consists of a metal box 5 inches square by 5¾ inches high, mounted upon a metal post to the bottom of which is attached a special plate. A lock switch in the post head permits only those with the proper key to open the garage door from the outside. This switch is a special switch which makes contact only when the key is inserted and turned. A self-restoring toggle switch, not locked, is provided in the post head. This allows the door to be closed but not opened. Thus it is not necessary to use a key in the driveway post when leaving the garage. The switch cover plate is held by screws but cannot be removed unless the key is inserted and the lock turned. Each driveway post is arranged for individual control of either of two garage doors.

The driveway post may be used wherever such a regulating device is desirable. Its height, which is 4½ inches, makes operation through the window of a car very simple and eliminates the necessity of leaving the car at any time. In cases where walls or entrances are not wide enough for the driveway post, a special wall fixture which is identical with the switch portion of the post may be fixed directly to any wall or surface. The driveway post is metal throughout.

THIS MARK IS MORE THAN A SAFEGUARD

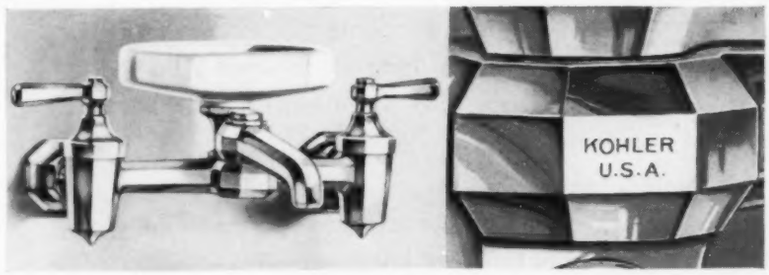


All Kohler enameled and vitreous china fixtures bear a permanent trade-mark in blue letters, permanently fused into the enamel or glaze; inconspicuous, yet readily found

WITH times as they are, the season is open on shoddy goods. Like every one else, the architect has to keep his weather-eye open. What you have to avoid are fixtures and fittings that look right now, but mean trouble later. You've got to stick to the sound doctrine that *half-right plumbing, at any price, is never good enough.*

And the best standby in a time like this is quality. Every Kohler fixture and fitting carries the word of the maker that the buyer gets full measure of what he asks for. That trade-mark stands for grace and strength in the large pieces. It points out the fine finish in each detail. It reminds customers that the real red brass fittings are simpler, heavier, longer lasting. It proves the craftsman principles back of each piece. *These* are the facts that keep both your client and you satisfied! It pays to specify reliable products. You can count on the Kohler trade-mark to back up your fight for quality. Point out to your clients that Kohler fixtures cost no more to install—and pay for themselves time after time by reducing running expenses, raising property values, and making for convenience and peace of mind.

Kohler Co. *Founded* 1873. Kohler, Wis.—*Shipping Point*, Sheboygan, Wis.—*Branches in principal cities.* . . . Makers of Kohler Electric Plants. Look for the trade-mark on each fixture and fitting.



All Kohler brass fittings have the name Kohler in raised or depressed letters

KOHLER OF KOHLER

PLUMBING FIXTURES AND FITTINGS

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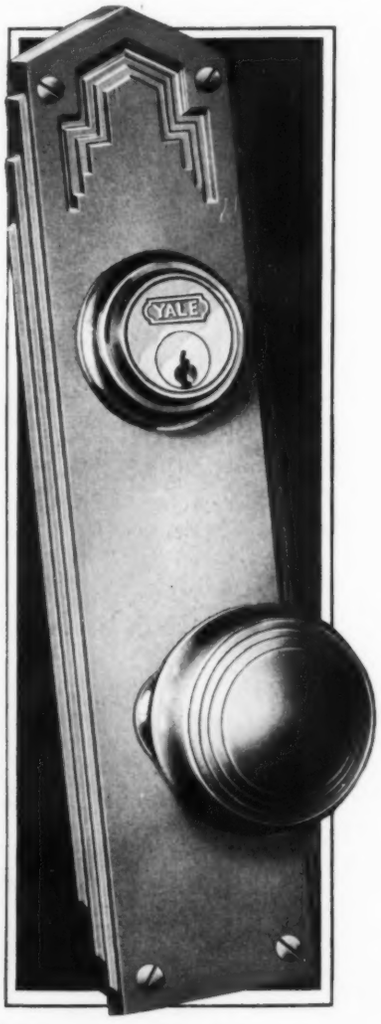

THE SPIRIT of friendship and co-operation which exists between architects and Yale Builders' Hardware contract dealers is the result, not only of long-established Yale quality and dependability, but also of a definite service.

Yale dealers realize that their most important function is to work closely with architects—to assist in determining proper builders' hardware allowances on various jobs—and to provide whatever other service architects may find helpful.

Your correspondence invited.

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DETAIL OF STEEL FRAMING

ARC-WELDED STEEL FRAME HOUSING

This house in Oberlin, Ohio, illustrates the use of structural shapes cut to size, welded into wall panels and assembled on the site with little scaffolding. Panels and bearing partitions averaged 14 to 18 feet wide, one story high, and 500 to 700 pounds in weight. The frame was erected on the foundation in approximately two days. Fleetweld electrodes and a "Stable-Arc" welder, manufactured by The Lincoln Electric Company, Cleveland, were used. Nine tons of steel were used. The erection cost ran $90 a ton as against $120 a ton by other methods.

"OR EQUAL"
WHAT IT REALLY MEANS

Columns are one thing about a building which must be made authentically correct and structurally right, if they are to give satisfaction.

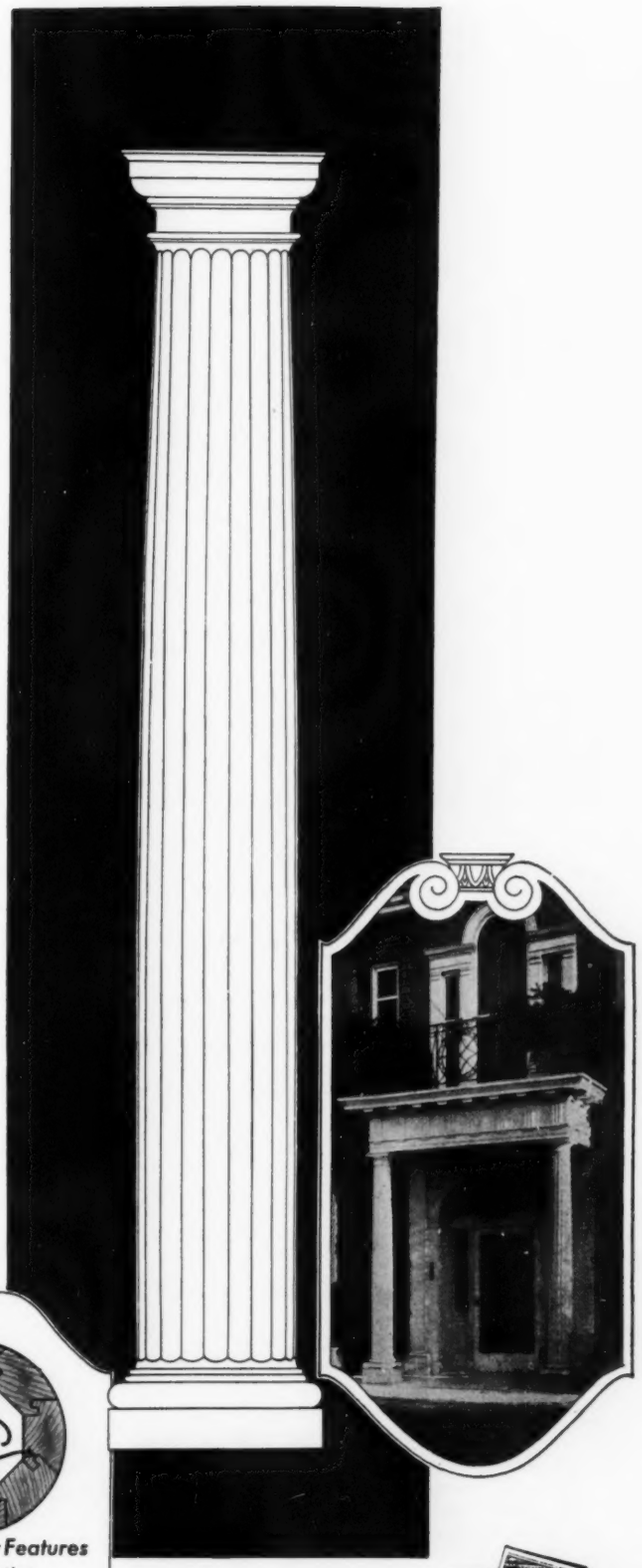
They are the first thing to attract the eye—therefore they must be right in design and detail. They are practically always placed in an exposed position and for that reason they must be built to withstand the weather without checking, warping or opening up at the joints.

In our thirty years experience in building columns, we have developed certain standards of manufacture which have proven to give permanent satisfaction.

Hartmann-Sanders Columns are, first, authentic in design and their careful exact workmanship is evident in the fidelity with which their smallest detail is executed. They are correct in entasis. The lumber we use is chosen for its proven resistance to weather and is absolutely clear and free from all knots and defects. It will not warp or check. The staves are uniform in thickness, so there are no thin weak places in the entire length of the column. The staves are joined by Koll's Patent Lock Joint and glued with waterproof glue. They cannot come apart.

Naturally it is not easy for the average manufacturer to equal Hartmann-Sanders specifications. However, should you specify columns "Hartmann-Sanders, or equal," be sure any columns you consider are built to these standards. To accept anything inferior is to invite dissatisfaction and heavy replacement costs in a few years.

If you insist on columns of this quality you will find price comparisons will favor Hartmann-Sanders, for our unusually complete equipment and large volume enables us to save wherever saving is practical.



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TALKING MOVIES
and
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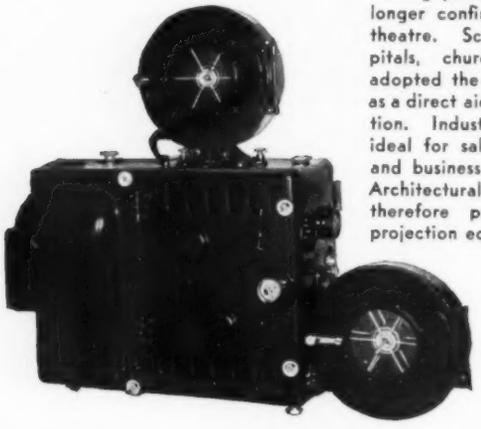

Talking pictures are no longer confined to the theatre. Schools, hospitals, churches have adopted the sound film as a direct aid to education. Industry finds it ideal for sales training and business expansion. Architectural plans must therefore provide for projection equipment.

The New Simplex-Acme SOUND PROJECTOR

A complete unit for the projection and reproduction of talking pictures. A new sound projector unit that brings professional efficiency to the modern educational or business institution. It combines portability with the latest scientific developments for correctly reproducing the sound film. Write for descriptive details of the Simplex-Acme Sound Projector. You'll find this data interesting and helpful.

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including practical information on such subjects as Sound Projection, Acoustics, Sight Lines, Wiring, Lighting Effects, Lens Foci, etc. First-hand knowledge gleaned from actual experience as the world's leading theatre engineers. Address, General Offices: 92 Gold Street, New York, N. Y.

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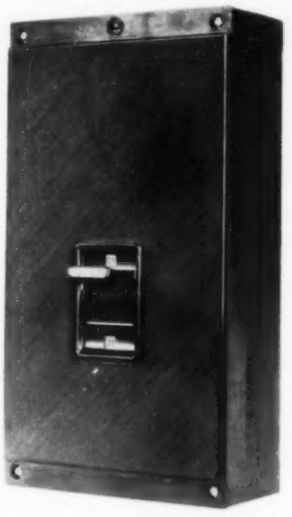
"DE-ION" CIRCUIT BREAKER

The Westinghouse Electric & Manufacturing Company announces a new group of circuit breakers based on the "De-ion" principle of arc extinction for the replacement of open knife switches. These breakers are safe, being entirely inclosed and live parts shielded. Because of the compactness of this new breaker it will be possible often to reduce by one half the size of switchboards over those using heavy duty air circuit breakers of equal capacity. This feature of compactness is important in buildings where conservation of rentable space is desirable. A high interrupting capacity is offered: the breakers rupture 10,000 amperes a-c. at rated voltage and 50% power factor within the first cycle.



The trip units have two separate tripping functions. The time delay is obtained through a bimetal, and an instantaneous tripw hich can be calibrated so as to require an inrush from 8 to 10 times breaker rating before tripping occurs. All breakers are mechanically-trip-free from the handle, which is the position indicator. An "on" and "off" marking indicates the position of the breaker in manual operation. When tripped automatically by the trip unit the handle stops halfway between the "on" and "off" positions.

NEW PAINT FINISH

The Paint and Varnish Division of E. I. du Pont de Nemours and Company announces Dulux White, a new finish for exterior painting. The new product is put on the market after five years of tests. The Dulux vehicle, which gives to Dulux White additional surface protection, is a synthetic oil product.

GLASS BLACKBOARDS

This product is offered by the New York Silicate Book Slate Company, New York City, as a synthetic substitute for slate. The surface of plate glass does not take a chalk mark, and until recently no treatment had been devised to give glass a writing surface comparable to that of slate in both smoothness and durability. The method which has been adopted is an incorporation of a fine abrasive in the glass mix. The roughness of the writing surface depends then on the coarseness of the abrasive, and being uniformly distributed, it insures a permanent surface since no matter how far the glass may be worn the surface is always the same. A very deep black glass can be obtained.

How 26 of New York's biggest and finest cut cleaning costs . . .

Here they are—
26 of New York's foremost skyscrapers—all equipped with Spencer Central Cleaning!

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Woolworth	55
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Waldorf-Astoria Hotel	47
Municipal	33
Sherry Netherland	38
Equitable Trust Company	42
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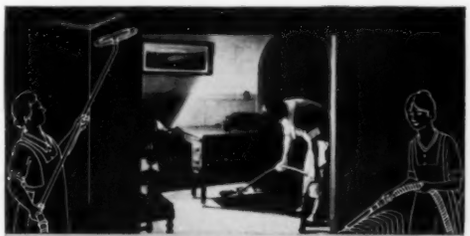
Downtown Athletic Club	31
Bank of New York Trust	32
Hotel Pierre	41
Chase National Bank	38
New York Telephone	31
444 Madison Avenue	43
19 Rector Street	36
Hotel New Yorker	43
News	36
National City Company	33
Savoy Plaza	33
Hotel Shelton	34
Hotel Governor Clinton	31
Hotel Lexington	30
Hotel Lincoln	30

• This list does not include the many Spencer equipped buildings under 30 stories high.

REVENUE . . . the demand for increased return on building investments . . . has dictated the constant changes in New York's skyline.

And the same demand for increased profit on building investments has dictated the selection of the Spencer Central Cleaning System for 26 of New York's biggest and finest buildings to cut cleaning and maintenance costs.

The Spencer System reduces cleaning costs because any floor area is cleaned faster . . . because the work is made lighter . . . because the powerful suction carries all dirt to a container in the basement, leaving no dust to settle on desks, walls and furnishings, thus greatly reducing building upkeep and maintenance.



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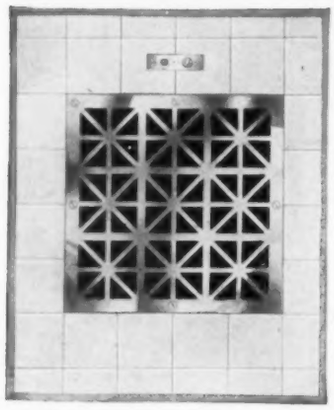

Not many concerns have been in business that long. Those who have survived the business storms of that many years naturally attract your confidence. You know there must be genuine merit in that which they manufacture—they *must* have maintained high principles—they *must* have been "square" toward their customers or they could not have scored 30 years of success.

We are naturally proud of our record. That just pride makes us jealous of the reputations of Prometheus Electric Heaters and Prometheus Plate Warmer and Towel Dryer. It compels us to be careful of that reputation—to make sure that every product which leaves our factory is worthy of the name "Prometheus" and deserving of your confidence.

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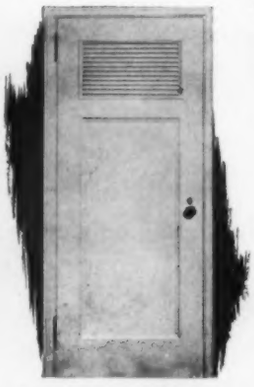

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PHELPS DODGE COPPER PRODUCTS CORP.

A new unit in the form of a vertical combination, the Phelps Dodge Copper Products Corporation, has been launched as the backbone of a new complete "mine to market" organization.

The name of the present fabricating subsidiary, National Electric Products Corporation, will hereafter be the corporate title of the National Metal Molding Division of the Company. National Electric Products Corporation will have its headquarters at Pittsburgh. Its plant is at Ambridge, Pa. Among the many products of national distribution, which it manufactures are rigid and flexible steel conduits, metal molding, armored cable, non-metallic conduit, thin walled tubing and ovalduct, steel outlet boxes and switch boxes, rubber covered wires and steel protected cables.

A new corporation, named Phelps Dodge Copper Products Corporation, will take over and operate the other fabricating divisions. These include the American Copper Producers Division with mills at Bayway, N. J., manufacturers of copper rods, wire and strip, bus bars and special shapes, stranded cables, trolley wire, bronze wire, bronze and brass wire, and weatherproof wire; the British American Tube Division with mills at Bayway, N. J., manufacturers of brass, bronze and copper pipe and condenser tubes; the Inca Manufacturing Division at Fort Wayne, Ind., manufacturers of enameled copper wire, coils, magnet wire; and the P-M-G Metal Division, manufacturers of copper and copper alloys in fabricated shapes which have special corrosion resisting qualities.

Habirshaw Cable & Wire Corporation will operate as a subsidiary of Phelps Dodge Copper Products Corporation. Habirshaw has plants at Yonkers and Nepperhan, New York and Bridgeport, Conn., and manufactures a complete line of rubber and lead covered wires, paper insulated power cables, telephone and telegraph wires, signal wires, Parkway cables, and miscellaneous cables of all kinds.

Both Phelps Dodge Copper Products Corporation and Habirshaw Cable & Wire Corporation have moved their present offices to 40 Wall Street, adjacent to the offices of Phelps Dodge Corporation. National Electric Products Corporation, in addition to its Pittsburgh offices, will have a sales office in New York City.

Through acquisition of the Calumet and Arizona Mining Company and prior acquisition of the Nichols Copper Company and the National Electric Products Corporation, Phelps Dodge Corporation is one of the three large units in the copper industry in the United States.

SARCO COMPANY

Sarco Company, Inc., of New York City, has incorporated a new company, the Spirax Manufacturing Co., Ltd., in London, for the manufacture of Sarco Steam Traps and other specialties for the British market.